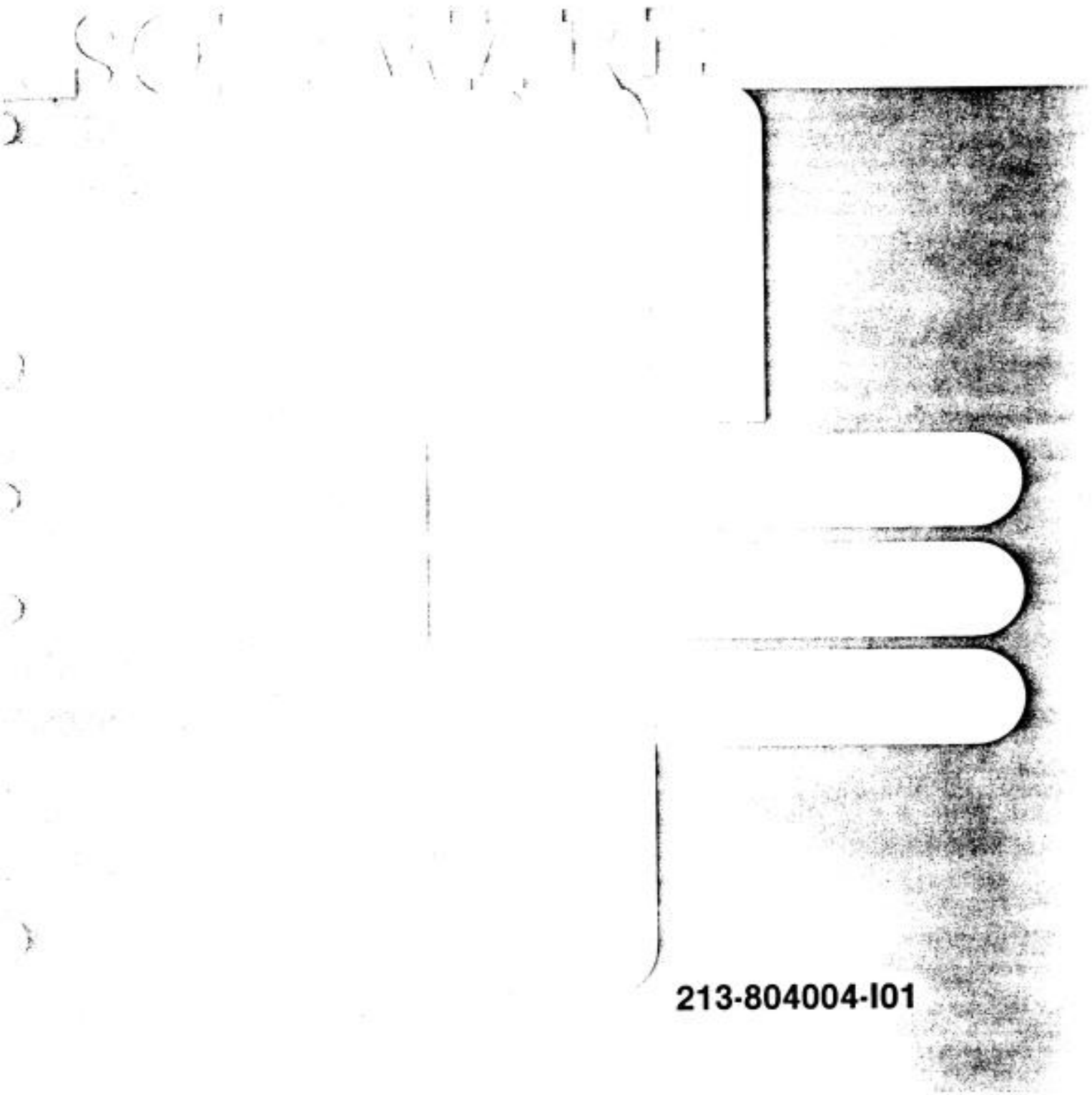
MODCOMP

MAX IV System Guide Manual

Operator Communications

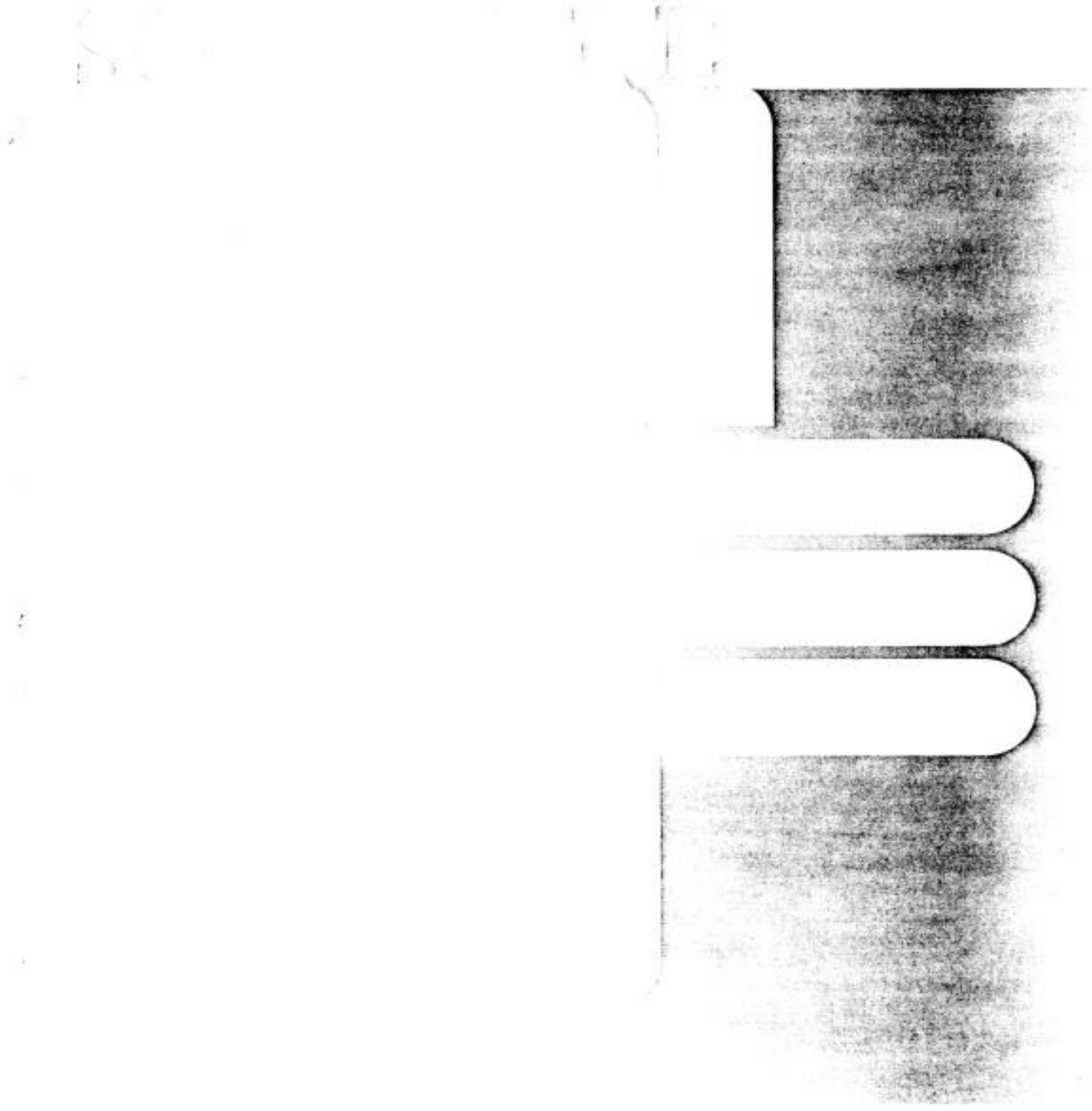


213-804004-I01

MODULAR COMPUTER SYSTEMS, INC.

MAX IV System Guide Manual

Operator Communications



MANUAL HISTORY

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Revision Level	Date Issued	Description
H00	05/83	Initial Issue (H.0). This manual replaces Chapter 5 of Manual Order Number 210-610304-000 and Chapter 10 of Manual Order Number 220-610304-000.
H01	11/83	Reissue (H.1.).
H02	07/84	Reissue (H.2.).
I00	09/84	Reissue (I.0). Changes included the addition of the following directives: AVA, BRO, CPD, FOL, MPI, MSG, SRG, TCL, TOL, WAC, WHO, and WTH. The DATE and ECM directives were modified.
I01	07/85	Reissue (I.1). Modifications were made to the following directives: DAT, MSG and TIME. Additional information was provided in the CPD, COM, BRO, and NUM directives. New examples were added in ARC, DEV, FCB, and LDT. Two DCS user directives were added: DCD and LCD.

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Audience
The information in this manual is directed to the applications programmer or developer with a good knowledge of MODCOMP Assembler language and familiarity with MAX IV SYSGEN and REX Services.

Subject
This manual describes the scope and function of the MAX IV Operator Communications (OC) Task.

Those users familiar with previous issues of MAX IV Operating Systems manuals will notice that the information in this manual appeared in either:

Chapter 10 MAX IV General Operating System Technical Manual

Chapter 5 MAX IV General Operating System Reference Manual

Products Supported
MAX IV Software System Model 8240I.

Special Symbols and Notations

NOTE: tname - Associated task name if specified or attentive task or double slash to indicate no associated task.

A revision bar (|) located in the margin of the page in the text indicates a change to the manual. This change generally represents a technical change to the prouduct due to product revision. A revision bar is also entered in the Table of Contents to flag the general location of changes in the text.

Related Publications
Refer to the following manuals for additional information. When ordering manuals, use the manual order number listed below. The most current revision level (REV) will be shipped.

Manual Order Number	Manual Title
211-804002-REV	MAX IV/MAX 32 NONRESIDENT JOB CONTROL AND BATCH FACILITIES Programmer's Reference Manual (PRM)
213-804002-REV	MAX IV SYSGEN System Guide Manual (SGM)
213-804005-REV	MAX IV BASIC I/O SYSTEM System Guide Manual (SGM)

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Revision I.1 Summary

Operator Communications, Rev I.1, includes MAXNET link information in the COM Directive. Syntax was corrected in several directives. Other changes include additional information in the following directives:

- DAT — Sets the Date portion of the Date/Time stamp.
- MSG — Includes the Date/Time stamp and the receiver's User ID.
- TIME — Sets the Time portion of the Date/Time stamp.

Additionally, examples were enhanced in the ARC, DEV, FCB and LDT directives, and some notes and corrections were made in the BRO, COM, CPD, and NUM directives.

The following directives were added for the Distributed Communication Subsystem (DCS):

- DCD — Displays LIM card memory.
- LCD — Activates SIO Loader Task and reloads LIM Monitor and handlers onto LIM card.

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CHAPTER 1
INTRODUCTION

This manual describes the operating system from the system operator's point of view. Operator Directives (command sentences) are described from the standpoint of their consequence on system performance.

The system operator can be:

- A person upon whom total system operation responsibility is placed.
- Several persons who enter the computer system's control point at random times, and who may or may not communicate with each other.

The operator's purpose is to set up and service I/O devices that require manual intervention. The operator can also be called upon by the system to make emergency decisions related to system hardware or software malfunctions that are beyond the control of the programmed system. Multiple operators, interacting with the **programmed system** from multiple (and possibly remote) application entry/retrieval terminals, and whose purpose is the normal usage of the specialized application programs, are not the subject of this publication.

1.1 THE OPERATOR AND THE PROGRAMMED SYSTEM

The **programmed system** is a term used to describe the operating system, its standard tasks (such as the Operator Communication (OC) task and the optional batch-processing tasks) plus all user-coded tasks and interrupt routines that convert the basic tool, MAX IV, into a complete application system. Many real-time systems are programmed to minimize the need for an operator. However, there are usually exceptional conditions that require operator assistance in even the most carefully planned **automatic** systems. The OC task can be degraded as a system element if an operator is never expected to be present except during scheduled system maintenance.

The operator can communicate with the programmed system either with operator directives in an asynchronous, unsolicited manner or with question-and-answer responses because of requests solicited from the programmed tasks. Task programs, operating on their own unique priority level, can solicit information by sending printed messages to the main system operator's terminal. The return response from the operator might be programmed as a READ operation which the task queues seeking specific information.

However, this form of direct question and answer programming is discouraged in a multiprogramming system at a central operator's terminal, when it is possible for more than one task to simultaneously and asynchronously interact with the same terminal. Such operating procedures are confusing to the operator who does not know which task has queued a particular READ operation to the common terminal.

MAX IV permits two tasks to use the system operator's terminal simultaneously without conflict. A single batch-processing task can use this terminal for its **control input** or **source input** entry point, while allowing the directives of the OC task to interrupt such usage.

1.2 OPERATOR COMMUNICATION TASK

The Operator Communication task is designed specifically to handle operator entry responses directed to any or all system and user tasks. Any tasks can request information in the conventional manner by writing messages to the operator using a global file CO (Computer-to-Operator). Since the possibility exists that several tasks might need assistance simultaneously in multiprogrammed systems, these messages are simply queued according to their calling task's priority level, and allowed to flood the operator with requests.

Each message has the name of the calling task (and its latest overlay name) appended to it for identification purposes. The operator is in a position to judge which task should be serviced first and responds by addressing that particular task. The operator's response can be processed and edited by the OC task -- and then passed to the subject task by direct manipulation of its system data structures -- or by passing information into global shared memory or secondary storage area.

The task can test agreed-upon criteria to determine when the operator's response has arrived and relinquish CPU time to other tasks while waiting. The queueing of a read to receive the information directly from the operator is avoided, and the task does not have to include in its coding the detailed and lengthy subroutines required to do the syntax analysis and number/string conversions required to process an operator's response.

Such a scheme also ensures a high degree of consistency in the manner an operator must enter responses, since only the syntax rules and conventions of the operator directive need be learned. When special application programs are added to the system which need operator responses not covered by standard operator directives, it is possible to add custom operator directives to the system that process the information needed to control the new application.

1.2.1 ATTENTIVE TASK

Directing an operator response to a particular task, when many tasks are requesting service, is accomplished by prefixing an operator directive with an optional task name, that is bracketed by slashes (/).

```
/name/directive.....
```

Once such a prefix has been entered, it need not be entered on subsequent directives as long as communication with the originally specified task is desired. The task name that has been most recently entered is called the attentive task in all directive descriptions in this manual.

1.2.2 GLOBAL FUNCTION

Some directives perform **global** functions not associated with any particular task. These directives ignore the attentive task name, or in some cases require the following null form -- which means that the command is directed to the **whole system:**

```
//directive.....
```

1.3 STARTING THE OC TASK

The OC task is **activated** by pressing the Console Interrupt (CI) switch on the main control panel of the CLASSIC 78xy computer. CONTROL "A" or BREAK, on controllers that support BREAK, can also be pressed at the operator's terminal to activate the OC task.

The Console Interrupt switch is dual purpose. Its second function (ENTER R/CTX) only has meaning to the computer when the machine is in a HALT state. Actually, the switch causes an interrupt at hardware priority level #E, and KILLS rather than ACTIVATES the OC task.

1.3.1 KILL THE OC TASK

Since the OC task is installed into MAX IV as an unabortable task, it responds to the KILL by interrupting itself and immediately restarting at its initial entry point. This feature of the task and the Console Interrupt switch are useful when the OC task is printing a lengthy report or executing a lengthy executive service and it is desired to stop it.

1.3.2 OC TASK PROMPT

The initiation or restart of the OC task is logged by the presence of the following prompting message to the system operator's terminal:

IV/taskname/ (Taskname is the current attentive task name.)

A system generation specification can be used to specify the initial attentive task name at system COLD START. The prompting message is followed by a READ operation being queued to the terminal. This action is indicated by a carriage-return or new line response that leaves the carriage cursor at column 1.

1.4 SHUTDOWN OF THE OC TASK

Because the system operator's terminal is a central receiving point for all important messages requiring the operator's attention, it is important that usage of this terminal by the operator does not hide or hold back important messages. However, it is even more important that when the system operator is continually flooded with messages, that there be a way to allow entry of emergency directives.

These seemingly conflicting requirements can be accomplished on the standard half-duplex terminal. First, the OC task uses a handler for this terminal that operates in a "1 and 1/2" duplex mode. This feature is accomplished by giving all WRITE operations queued by tasks priority over READ operations. Thus, if a READ is queued and initiated, a WRITE message to the operator will interrupt it, inform the operator, and then restart the previously queued READ operation.

This can at times be an inconvenience to the operator who is attempting to enter a long directive, since such interruptions force the reentry of the entire directive. To temper the inconvenience, the OC task will prevent such interruptions during the entry of the first directive after the Console Interrupt switch has been pressed. The operator can thus guarantee uninterrupted entry by depressing the Console Interrupt switch before each entry.

To prevent any indefinite hold-back of messages, the task has **watchdog** timers associated with it that force it to shutdown and dequeue any READ operation to the terminal, should too much time expire without operator activity. Thus OC will normally shut itself down within about 10 seconds after a READ is queued, if no character has been entered by that time. If a character has been entered, then a two minute time period is allowed before automatic shutdown is forced.

A manual shutdown of OC can be caused by typing certain forms of certain directives -- called **final** directives.

1.5 OPTIONS USED BY THE OC TASK

The OPTION SYSGEN statement can be used to set option values in the System Option Word for the OC task. These options will be enabled/inhibited for the OC task at system start-up. The functions of the OC task options are listed in Table 1-1.

BIT	NAME	FUNCTION IF SET
0	U0	The OC task (in response to a Console Interrupt) will NOT impose the two minute time-out on the operator after the first character is detected.
1	U1	The OC task will NOT perform the next READ to the OC file after completing a directive.
2	U2	The OC task will NOT output the initial message and READ to the OC terminal at system start-up.
3	U3	The OC task will never time out waiting for an operator response. Option U3 is intended for use in a discless system.
4	U4	The OC task will change the attentive task name to X when '//' is typed.
5	U5	The OC task will NOT take exclusive use of the CO file.
6	U6	The OC task will NOT print the "OC RETURNED TO DEFAULT" message.

Table 1-1. OC Task Options and Bit Location in the OC System Option Word

CHAPTER 2
SUMMARY OF DIRECTIVES

Operator directives fall into many functional categories. Some are designed to permit the system operator to control I/O devices and tasks that require manual attention. Other directives can modify the structure (and if not used intelligently -- the integrity) of the operating system. These are designed to be used by the system programmer for system maintenance and for debugging new system elements and privileged tasks. Still others deliver only information in the form of short reports. Each directive is briefly described in its appropriate class below, and in detail in the following chapter.

2.1 SYSTEM SET-UP CLASS

These directives prepare the system for operation by supplying it with current information that it is not capable of getting from the system generation process.

/BIA[S] -- Sets two addresses used as references by many other directives. These addresses allow pauses and memory dumps to be made relative to certain programs or subroutines.

/DAT[E] -- Sets (or gets) the current date in days, months, and years.

/taskname/... -- Is either a directive or directive prefix that indicates the name of the task to which this and subsequent OC input should be directed. (Such a task is called the attentive task.)

/TIM[E] -- Sets (or gets) the current time-of-day in hours, minutes, and seconds.

2.2 UTILITY CLASS

/BRO -- Broadcasts a message to all terminals of MAGIC users.

/CNV -- Converts a character string, representing either a decimal number, hexadecimal number, or CAN-code into all three forms.

/DEL -- Starts or checks a delay timer for OC task.

/EVE -- Passes an event to the event logging package.

/LOG -- Displays or changes the event logging package configuration.

/MSG -- Sends a message to a specified terminal of MAGIC user.

/N[UM] -- Converts a character string, representing either a decimal number, hexadecimal number, or CAN-code into all three forms. Also adds, subtracts, multiplies, and divides 16- and 32-bit numbers.

2.3 INFORMATION DISPLAY CLASS

/AVA -- Displays available ports on all multi-batch system terminals running the MAGIC product.

/CID -- Displays CPUID and/or CPUNAME and provides the capability of redefining either.

/DAC[TUAL] -- Prints, on the DO file, the same information as TACTUAL.

/DIN[STRUCTIONS] -- Prints, as does DOPERANDS, except that the instruction addressing space is used.

/DIS[PLAY] -- Prints on the DO file, the same information as TYPE.

/DOP[ERANDS] -- Prints on a hard-copy printing device, the same information as TOPERANDS.

/ECM -- Displays/modifies status of memory planes on a CLASSIC 78xy.

/GSR -- Displays global shared region directory list and optionally modifies SRO bit.

/I[NF[ORMATION]] -- Displays information about all tasks or the attentive task.

/KIN -- Displays the attentive task's WORKBENCH TCB extension in REX DUMP format.

//LDT -- Reports transient disc LDT availability.

/MES -- Displays ITC message node information.

/MPI -- Displays information on the attentive task's current status plus additional information on PSD, register contents, pending I/O nodes and ITC requests.

/MPL -- Displays map pool list.

//NDP -- Reports I/O node usage and availability.

/PRT -- Displays ITC port information for one or all ports in the system.

/PWR -- Displays current power status and history, and optionally resets history bits.

//QUE -- Reports system MAP 0 resident work queues (used primarily by X and FMX tasks).

/RBL -- Displays register block list.

/SRG -- Displays shared region directory information.

//SPL -- Reports transient MAP 0 page availability.

/SVR -- Displays list of server names and related task names used in ITC.

/TAC[TUAL] -- Displays, on the CO file, a decimal or hexadecimal dump of regions of actual memory, including the contents of global shared regions, by name and subscript index.

//TBP -- Reports TCB usage and availability.

/TCL -- Displays terminal control list information if one is configured.

/TIN[STRUCTIONS] -- Displays, as does TOPERANDS, except that the attentive tasks virtual instruction addressing space is dumped.

/TME
/MEM -- Informs the operator of the current system memory configuration and availability.

/TOL -- Prints the contents of the TOCLOCK linked list data structure.

/TOP[ERANDS] -- Displays on the CO file, a hexadecimal or decimal dump of selected regions of the attentive task's (or the system's) virtual operand addressing space.

/TYPE -- Displays on the CO file, one of several short information reports about the attentive task or the system.

/VIE[W]
/VOP
/VIN -- Sets-up a particular system's (or task's) virtual addressing space or actual memory region to be constantly stored by the optional dynamic memory display on the front panel of the CPU.

/WHO -- Displays system users and what overlays they are running. This OC is for the MAGIC product users.

2.4 MEMORY MODIFICATION CLASS

This class of directives should only be used by an experienced system programmer.

//CPD -- Modifies the definition of a disc partition.

/MAC[TUAL] -- Modifies a region of actual memory, including the contents of global shared regions, by name and subscript index.

/MIN[STRUCTIONS] -- Modifies a region of memory within the virtual instruction addressing range of the attentive task or the system nucleus.

/MOD[IFY] -- Modifies a region of memory within the virtual operand addressing range of the attentive task or the system nucleus.

/MOP[ERANDS] -- Modifies a region of memory within the virtual operand addressing range of the attentive task or the system nucleus.

2.5 SYSTEM DEBUGGING CLASS

This class of directives should only be used by an experienced system programmer.

/PAU[SE] -- Installs and enables a single pause and register trace breakpoint in the attentive task's program undergoing debugging. Once installed, a register dump and optional pause in task execution result if the task executes the instruction replaced by the pause.

/SEA[RCH] -- Searches the attentive task's virtual memory over a specified range for a masked or non-masked value and displays on the global CO file the results of the search.

/SHA[DOW] -- Enables and controls the optional system tracing and sampling functions. It is used to gather evidence when the programmer is debugging new program elements. Can be used in conjunction with any external pulse generator.

/WAT[CH] -- Enables and controls a particular feature of the SHADOW that constantly watches the state of a particular memory cell located in actual memory or in the system's (or a task's) virtual addressing range. If this cell is involved in a known system failure, this feature can halt or freeze the system at the closest possible instant that the cell's contents change from the expected.

2.6 TASK CONTROL CLASS

These directives affect the execution of tasks. The influence level of the OC task can be configured at system generation time to limit these directives to only certain tasks.

/A[BO[RT]] -- Same as KILL but also causes the OC task to shutdown following its execution.

/ACT[IVATE] -- Begins the execution of the attentive task.

/CHA[NGE] -- Temporarily changes the priority level of the attentive task.

/DCI -- Reassigns a background task's CI file assignment and then ABORTS the task.

/DEE[STABLISH] -- Removes the established resident state from a nonresident attentive task so that it leaves the system when it next exits or is aborted.

/EST[ABLISH] -- Loads and makes a nonresident attentive task take on the characteristics of a resident task.

/E[XE[CUTE]] -- Same as ACTIVATE but also causes the OC task to shutdown following its execution.

/H[OL[D]] -- Unconditionally suspends the execution of the attentive task until further notice.

/K[IL[L]] -- Abnormally terminates (aborts) the execution of the attentive task. A post-mortem hexadecimal dump can also be initiated for the terminated task.

/LET -- Defines or sets the values of one or more **mailbox** variables of the attentive task.

/OPT[IONS] -- Sets (or resets) one or more system options of the attentive task. A variant will also display these current task options.

/PIP[ELINE] -- Displays or modifies the capability of the task to run in the pipeline mode.

/POP[TIONS] -- Sets (or resets) one or more program options of the attentive task. A variant will also display the current task options.

/REL[EASE] -- Resumes the execution of the attentive task if it is suspended. One of the task's **mailbox** variables can also be set during the process.

/R[ES[UME]] -- Same as RELEASE but also causes the OC task to shutdown following its execution.

/ROL[L] -- Forces a task to roll out of main memory or to roll into main memory.

/VAR[IABLES] -- Defines, sets, or deletes variables of the attentive task.

/WTH -- Displays the state of the attentive task on the CO file.

2.7 TASK SCHEDULER CONTROL CLASS

/CON[NECT] -- Allocates a system timer or interrupt task scheduler to the attentive task for the subsequent execution of an ACTIVATE, RESUME or KILL service.

/FRE[EZE] -- Disables a task scheduler (timer or interrupt).

/REC[ONNECT] -- Changes parameters in an existing, connected frozen timer or interrupt scheduler.

/RET[HAW] -- Enables a previously allocated task scheduler (timer or interrupt) and sets new criteria for its execution.

/THA[W] -- Enables a task scheduler (timer or interrupt).

/UNC[ONNECT] -- Removes the link between a task scheduler (timer or interrupt) and the scheduled task.

2.8 I/O DEVICE CONTROL

All of these operations affect the logical files of a particular attentive task or the system's global logical files. The installed influence level of the OC task can limit its influence over certain devices.

/ASS[IGN] -- Associates a new device or logical file with the current assignment of a particular logical file of the attentive task (or the system's global logical file). This directive can also create new logical files for a task if vacancies exist in its Task Control Block (TCB).

/AVF[ILE] -- Advances one or more physical records on an I/O device until a file mark or end-of-medium is found.

/AVR[ECORD] -- Advances one or more physical records on an I/O device.

/BKF[ILE] -- Backspaces one or more physical records on an I/O device until a file mark or beginning-of-medium is found.

/BKR[ECORD] -- Backspaces one or more physical records on an I/O device.

/DEF[AULT] -- Same as ASSIGN except changes the **default** rather than the **current** assignment of an attentive task's logical file.

/GIV[E] -- Gives-up exclusive use of an I/O device that might be held on the behalf of the attentive task.

/HOM[E] -- Normalizes an I/O device.

/REW[IND] -- Repositions an I/O device to beginning-of-medium.

/TAK[E] -- Takes exclusive use of an I/O device on behalf of the attentive task.

/TER[MINATE] -- Abnormally terminates I/O device operations already queued.

/WEO[F] -- Writes an "End-of-File" mark on an I/O device.

The following operations are directed to devices by name.

/ARC -- Used to print currently defined File Manager area controls.

/FCB -- Used to dump or provide the address of a specific File Control Block (FCB).

/FOL -- Displays a list of the logical file name and the task's name associated with it for any File Manager file in the system that is currently **offline.**

/ISX -- Reports hardware status of a device address, device address associated with a Transport Control Table, or all device addresses reporting non-zero status.

/LDT -- Used to dump or provide the address of a specific Logical Device Table (LDT).

/LEN -- Set the page length of a printing device.

/LTT -- Used to dump or provide the address of a specific Logical Transport Table (LTT).

/OFF -- Places a device offline and unavailable for use by any task until further notice.

/ON -- Returns a device to an operable state. The device may have been placed offline by OFF or by its own handler detecting unrecoverable failure.

/TCT -- Used to dump or provide the address of a specific Transport Control Table (TCT).

/TRA -- Used to obtain or change the status and/or responsibility of a transport in the system.

/WAC -- Scans through the volume users list and checks each task to determine which task has area control of the specified file.

/WID -- Set the page width of a printing device.

CHAPTER 3
DIRECTIVES

This chapter presents detailed discussions of each Operator Communication Directive. The discussions are presented in alphabetical order based on the directive name. Each discussion includes a functional description of the directive, the syntax of the directive, and examples of use. Key words at the beginning of each directive aid in location.

3.1 SYNTAX RULES FOR OPERATOR DIRECTIVES

An OC Directive consists of a slash followed by an optional task name and a slash. The slash is followed by a directive name and, depending on the directive, appropriate parameters.

/[taskname/] OCDirective param1, param2, ...

The optional task name allows the operator to direct an operator communication to a particular task. Once specified that task name is referred to as the **attentive task.**

The directive name identifies the function to be performed. The parameters are arguments that convey necessary information such as file names, device names, numeric values, et cetera. The following rules apply when entering OC Directives.

Although several delimiters can be used to separate the parameters of a directive following its task name and keyword, only blanks are shown in the descriptions. The comma and equal sign are acceptable except where noted otherwise. The slash character is not acceptable following the main keyword, but can be used to separate subsequent parameters.

If the entry terminal operates in a **conversational** mode, the backspace character (BS=CONTROL "H") erases the most recently entered character(s). The DELETE (or RUBOUT) character causes the terminal handler to erase the entire directive and restart the READ operation on a new line. In conversational mode, the entry of a CARRIAGE-RETURN causes the entered directive to be processed by the OC task.

When other terminal modes are used, corrections can be made locally at the terminal and the Transmit (XMIT) key is usually required to send the directive.

In presenting the syntax for the OC Directives:

xxx - Lower-case characters indicate that the value of the parameter must be supplied by the user.

XXX - Upper-case characters indicate the keyword of the directive.

[ ] - Square brackets are used to indicate that the enclosed information is optional.

{ } - Braces indicate that at least one of the keywords or parameters must be specified.

ABORT, KILL, A, K, SAM

Abnormally Terminate My Task's Execution If It Is Active

The ABORT, KILL, A, K and SAM Directives cause the attentive task (tname) to have its execution (and all I/O operations) terminated. A REX KILL service is executed by the OC task on behalf of the attentive task.

The ABORT or A Directive causes the OC task to accept no further directive until the Console Interrupt switch is depressed. The KILL or K Directive causes the OC task to continue to read directives. The SAM Directive is equivalent to KILL or K except that the abort message is suppressed. This is useful in a memory tight situation when a map zero page cannot be obtained to output the abort message.

The reason code in the abort message will be COP (computer operator). The OC task must have an influence limit higher than or equal to the task aborted.

```
!ABORT (COP OC where *)/tname/overlay name
```

A task cannot be aborted if its influence level is higher than that of the OC task.

SYNTAX

```
[/tname]/ABO[RT]     [DU[MP]]
[/tname]/A           [NO[DU]]
[/tname]/KIL[L]
[/tname]/K
[/tname]/SAM
```

`[DU[MP]]`
`[NO[DU]]`

(OPTIONAL) Parameter 1 represents of of the following:

If the keyword **DUMP** is specified, a dump of the task's register and body is output to the DO file.

The keyword **NODU** will inhibit the dump. If neither keyword is included, the state of the attentive task's system option Bit IS will determine whether a dump will be made.

EXAMPLES

```
/B/A
/XYZ/KILL NODU
```

Start My Task's Execution If It Is Not Already Active

The ACTIVATE, EXECUTE and E Directives cause the attentive task (tname) to be activated at the specified priority level and to be loaded from the specified file. If the task is resident or established resident or is connected to a timer or interrupt, the priority and file arguments are ignored. If the priority of a nonresident task has been specified at cataloging time in its directory, the priority argument is ignored in favor of the priority level specified at cataloging time. The file LM is used if the file argument is missing. The /EXECUTE Directive has the additional feature of causing the Operator Communication task to stop requesting further directives. A task cannot be activated if its influence level is higher than that of the OC task.

SYNTAX

```
[/tname]/E              [priority]      [logfile]
[/tname]/EXE[CUTE]
[/tname]/ACT[IVATE]
```

[priority] (OPTIONAL) Parameter 1 is the default priority level of the task if not already in the system and the priority level was not fixed for the task when it was cataloged.

[logfile] (OPTIONAL) Parameter 2 is the logical file (assumed to be global) from which the task will be loaded if it is not already in the system.

EXAMPLES

```
/XYZ/ACT
```

Activate task XYZ from file LM.

```
/ABC/E 200 BM
```

Activate task ABC from file BM and use priority of 200 if not cataloged with a specific priority.

ADUMP

Display And Modify The Actual Memory Dump Table

The ADUMP Directive displays and optionally modifies the actual memory dump table information. It is used to redirect the destination of a memory dump should the system crash.

SYNTAX

/ADU[MP] [device]

[device] (OPTIONAL) Parameter 1 is a 1- to 3-character CAN-code logical device name. When specified, the destination of an actual memory dump is changed to that device. When omitted, the contents of the actual memory dump table is displayed. The device must be either a magnetic tape or a disc partition of geometry 1 record size 0. Disc information displayed for the transport name and starting track is always with respect to the physical (not logical) transport.

EXAMPLES

```
/ADU

ACTUAL MEMORY WILL DUMP TO
    DEVICE NAME SAV
    AT DEVICE ADDRESS #01
    ON TRANSPORT 1
    ON TRANSPORT NAME L01
    STARTING AT TRACK #0C89
```

The contents of the actual memory dump table are displayed. Nothing is modified.

```
/ADU MT1

ACTUAL MEMORY WILL DUMP TO
    DEVICE NAME MT1
    AT DEVICE ADDRESS #04
    ON TRANSPORT 0
    ON TRANSPORT NAME MT1
```

The contents of the actual memory dump table are modified to cause an actual memory dump to go to MT1.

Print Area Controls For Logical Transport And Associated Tasks

The ARC Directive will print the File Manager area controls currently defined for one or all logical transports or those concerning a single task for one or all logical transports. It prints the task name, logical file name, File Control Block (FCB) actual page number, logical transport name, and area control usage and DPI. If the first nibble (leftmost) of the DPI is an eight then this is an area control that caused a contention relinquish on a task that received an area control lockout. The second nibble indicates the operational usage of the area control, as per the following table.

CODE IN HEX	OPERATIONAL USAGE SPECIFICATION (OUS)
1	Concurrent read
2	Concurrent write
3	Concurrent both (read/write)
5	Protected read
6	Protected write
7	Protected both
9	Exclusive read
A	Exclusive write
B	Exclusive both

SYNTAX

[/task]/ARC [ltn]

task — Represents associated task name if specified or attentive task or double slash to indicate no associated task.

[ltn] — (OPTIONAL) Parameter 1 represents the logical transport name. (Default = all logical transports are indicated.)

EXAMPLES

```
//ARC
```

Display on the device assigned to the CO file all area controls currently defined.

```
/B/ARC
```

Display on the device assigned to the CO file all those area controls referencing task B.

```
//ARC M1
```

Display on the device assigned to the CO file all those area controls referencing logical transport M1 no matter what the task.

/B/DIS ARC M2

Print on the device assigned to the DO file those area controls for logical transport M2 referencing task B.

OUTPUT EXAMPLES

```
//DIS ARC
Transport:  U0    Volume:  UNXSRC
  task   LFN    FCB    AC      DPI     filename
BAT009   T09   #09B4   cb   #0208E8   USR:009/SCD
BAT009   X09   #09B5   cb   #0208D5   USR:009/SCC
BAT009   V09   #09B6   cb   #0207BA   USR:009/SCB
BAT009   Z09   #09B6   cb   #0207B9   USR:009/SCA
BAT006   FMA   #09BE   cb   #0207C6   fmgr.a0
BAT006   T06   #09C1   cb   #01F463   USR:006/SCD
BAT006   X06   #09C2   cb   #01F462   USR:006/SCC
BAT006   V06   #09C3   cb   #01F461   USR:006/SCB
BAT006   Z06   #09C4   cb   #01F460   USR:006/SCA

Transport:  U1    Volume:  UNXUSR
  task   LFN    FCB    AC      DPI     filename
BAT009   U09   #09B8   cb   #020278   USR:009/SC
BAT009   J$C   #09B9   eb   #01F44F   UNIX:DOC:/TJC
BAT009   U$L   #09BA   eb   #01F450   UNIX:DOC:/LIB
BAT009   L$M   #09BC   eb   #01F451   UNIX:DOC:/LMF
BAT006   U$S   #09BD   eb   #01F44E   UNIX:DOC:/USL
BAT006   U06   #09C5   cb   #01F440   USR:006/SC
BAT006   J$C   #09C6   cb   #01F455   UNIX:DANG:/TJC
BAT006   U$L   #09CA   cb   #01F456   UNIX:DANG:/LIB
BAT006   L$M   #09C9   cb   #01F457   UNIX:DANG:/LMF
BAT006   U$S   #09CF   cb   #01F454   UNIX:DANG:/USL
GM       MG    #09D7   cb   #01F470   QUEUE:MANAGER

Transport:  U2    Volume:  UNXTMP
  task   LFN    FCB    AC      DPI     filename
BAT009   Y09   #09B3   cb   #0000AB   WRK/DOC
BAT009   XDA   #09BF   cb   #0000B1   NEW32XDA
BAT009   Y06   #09C0   cb   #0000AF   WRK/DANG

BAT009/DIS ARC
Transport:  U0    Volume:  UNXSRC
  task   LFN    FCB    AC      DPI     filename
BAT009   T09   #09B4   cb   #0208E8   USR:009/SCD
BAT009   X09   #09B5   cb   #0208D5   USR:009/SCC
BAT009   V09   #09B6   cb   #0207BA   USR:009/SCB
BAT009   Z09   #09B6   cb   #0207B9   USR:009/SCA

Transport:  U1    Volume:  UNXUSR
  task   LFN    FCB    AC      DPI     filename
BAT009   U09   #09B8   cb   #020278   USR:009/SC
BAT009   J$C   #09B9   eb   #01F44F   UNIX:DOC:/TJC
BAT009   U$L   #09BA   eb   #01F450   UNIX:DOC:/LIB
BAT009   L$M   #09BC   eb   #01F451   UNIX:DOC:/LMF
BAT006   U$S   #09BD   eb   #01F44E   UNIX:DOC:/USL
```

Assign Device Or Logical File To Logical File Of My Task

The ASSIGN and DEFAULT Directives associates some device or logical file (already assigned to a device) with a logical file name to be referenced in some program of the attentive task. If the logical file is associated with a device, then the File Position Index will be set to zero, which effectively **rewinds** the file. If the logical file is associated with another logical file, then the File Position Index will be set to the value of the other logical file. If the logical file name is not found in the File Assign Table and a vacant entry exists in the table, a new logical file will be created. If the logical file name is assigned to **itself** it will revert to its **default** assignment. A file with no default assignment will be returned to a vacant state. The default assignment can be associated with a device or other logical file by typing the DEFAULT Directive instead of ASSIGN.

SYNTAX

```
[/tname]   /ASS[IGN]     [logfilname     [devname    ]]...
           /DEF[AULT]    [               [logfilnamtwo]]
```

[logfilname] (OPTIONAL) Parameter 1 is a logical file name. It must contain from 1- to 3-CAN-code characters.

[devname]
[logfilnamtwo] (OPTIONAL) Parameter 2 specifies one of the following:

logfilnamtwo is a logical file name which must already exist and be assigned utimately to some device or real file. This file can exist in the FAT of the attentive task, or in the Global File Assign Table (belongs to the X task).

devname is the name of a device in the System Device Table to be associated with **logfilname.**

EXAMPLE

```
/B/ASSIGN CI=CR
```

Assign CI file of task to card reader.

AVA

Display Available Ports

The AVA Directive lists all the available ports (User ID=0) on a multi-user system. AVA uses the PORTINFO REX Service to access the User ID information, which is maintained by the MAGIC product.

SYNTAX

/AVA

EXAMPLE

```
/AVA
PORT 2
PORT 7
PORT 8
```

Multi-user ports 2, 7, and 8 are not in use. All other ports are active.

Set Subroutine And Task Relocation Bias For Relative Display/Modify/Pause

The BIAS Directive sets the values of two numbers which are remembered until changed. These numbers can be used subsequently by the TYPE, DISPLAY, and MODIFY Directives (and their many forms) when it is desired to specify a relocatable address rather than an absolute address. Both numbers are typed in hexadecimal form after they are entered. The sum of both numbers (signs and overflow ignored) will be added to any address specified in relocatable form (preceded by a $) by the other Directives.

This directive is of particular use when working with a relocatable subprogram listing, when this subprogram has already been link-edited to another program and the final program was relocated in its addressing space at cataloging time.

SYNTAX

/BIA[S] [viraddress][TASK]

[viraddress] (OPTIONAL) Parameter 1 is the known relocation address bias of a program or subroutine of a program (as obtained from a LINK EDIT map). This number is called the subroutine bias.

If this parameter is preceded by a dollar sign ($), then it will be added to the previously existing subroutine bias instead of replacing the previous subroutine bias.

[TASK] (OPTIONAL) Parameter 2 causes the task bias to be set when specified. This bias can only be set if the attentive task is ACTIVE or ESTABLISHED; the resultant address is the **lowest virtual address** of the task's load program. This is generally the address specified by the TOC BIAS Directive, if the program is manually relocated in its addressing space at cataloging time.

EXAMPLES

```
/B/BIAS #36CE TASK
```

Set the subroutine bias to #36CE and the task bias to the first loaded location of the latest overlay of task B.

```
/BIAS #FF00
```

Set only subroutine bias and zero task bias. No particular addressing space is assumed.

```
/BIA $1
```

Add 1 to previously entered subroutine bias.

NOTE: Unpredictable results can be expected if the attentive task name at the time the BIAS Directive is entered is **NOT** the same attentive task name that exists when the DISPLAY or MODIFY Directive is entered.

Broadcast A Message To All Terminals

The BRO Directive broadcasts a message preceeded by the DATE/TIME STAMP (if the DTS option is specified in the SYSGEN) to all terminals of a multi-batch system that have a nonzero User ID. This directive uses the PORTINFO REX Service to access the User ID information, which is maintained by the MAGIC product.

SYNTAX

/BRO message

message (REQUIRED) Parameter 1 is an ASCII string.

EXAMPLE

/BRO, There is a staff meeting at 2:00 pm today.

BUF

Print Contents Of Attentive Task's Service Buffer

The BUF Directive prints the contents of the attentive task's service buffer, if any exists.

SYNTAX

[/tname]/BUF [NOS]

EXAMPLE

/BUF

```
*SERVICE BUFFER*
BUF(19FB) 8100 01ED 0000 9FFF 0104 0108 8319 0000 /0C
BUF(1A03) 0103 010C 794C 0000 0104 010F 5FF0 0000 /0C
BUF(1A0B) 2100 010F 5EB6 0000 0103 0113 53CC 0000 /0C
BUF(1A13) 0103 0116 70DC 0000 0103 0119 7A42 0000 /0C
BUF(1A1B) 0104 011C 66E4 0000 0105 0120 521B 0000 /0C
BUF(1A23) 0104 0125 142C 0000 0102 0129 4636 0000 /0C
BUF(1A2B) 0103 012B 5E4A 0000 0107 012E 1525 0000 /0C
BUF(1A33) 0105 0135 06F5 0000 011A 013A 76C0 0000 /0C
BUF(1A3B) 0121 0154 7133 0000 0111 0175 7F18 0000 /0C
BUF(1A43) 0111 0186 53E6 72E4 0116 0197 7940 0000 /0C
BUF(1A4B) 011F 01AD 6C48 0000 0119 01CC 1C08 0000 /0C
BUF(1A53) 0104 01E5 66BD 0000 0102 01E9 27EA 5438 /0C
BUF(1A5B) C100 0000 0000 0000 2104 1502 00FE 1700 /0C
BUF(1A63) 0000 0121 0121 1701 0000 0121 0121 2100 /0C
BUF(1A6B) 0400 0009 7EE2 0000 FFFE 0120 0A02 0000 /0C
BUF(1A73) 2822 4002 0A01 0030 0140 0A01 0050 0101 /0C
FROM  1A7B  TO   1AEA  ALL      0000
BUF(1AEB) 0000 0000 0000 0000 0000 78C8 9400 1AF9 /0C
BUF(1AF3) 0100 000F 0800 0001 19FB 0100 0000 0008 /0C
```

Change My Task's Execution Priority Level

The CHANGE Directive alters the priority level of task execution. The attentive task, if active or scheduled, is removed from the CPUQ and then returned to that queue at the new specified priority position. Any I/O operations which were queued prior to the change continue at the priority of the task before the change, but all subsequent I/O operations are queued at the new priority level. A task's priority cannot be changed by this directive if its influence level is higher than the influence level of the OC task.

SYNTAX

[/tname]/CHA[NGE] priority

priority (REQUIRED) Parameter 1 is the new desired priority level number that must be in the range 0 to 255 and cannot be higher than (smaller number than) the task's influence level.

EXAMPLE

/XYZ/CHANGE 200

Change the priority of task XYZ to 200.

CID

Obtain/Modify CPUID And/Or CPUNAME

The CID Directive is used to print the CPUID and/or the CPUNAME or to change either one of them.

SYNTAX

/CID [NA[ME]] [string]
[ID] [value]

[NAME]
[ID] (OPTIONAL) Parameter 1 must be a keyword. (Refer to default below.)

NAME specifies that the CPUNAME is to be printed, or modified and printed.

ID specifies that the CPU-ID is to be printed, or modified and printed.

[string]
[value] (OPTIONAL) Parameter 2 can be specified in the following conditions:

string - Can be specified if NA[ME] is specified and is a string of up to sixty-four ASCII characters (excluding non-printing, comma, slash, plus, minus, hexadecimal, dollar, or blank characters) that will replace the old CPU-NAME.

value - Can be specified if ID is specified and can be any single precision assembly value that will replace the old CPU-ID.

DEFAULT: If neither NAME nor ID is specified, an attempt is made to print both. In any case, the CPU-ID or CPU-NAME returned will be the latest copy. Error returns are made for the following reasons:

- CPU-ID and CPU-NAME were both requested and neither has been initialized.
- Only the CPU-ID was requested but was not initialized.
- Only the CPU-NAME was requested but was not initialized.

Error messages will be printed if:

- Value contains an illegal character
- Identifier string contains a special character
- Value is too large

EXAMPLES

```
/CID NAME
 CPU-NAME IS TEST_SYSTEM_NUMBER_1

/CID
 CPU-ID IS #1001
 CPU_NAME IS TEST_SYSTEM_NUMBER_1

/CID ID #1111
 CPU-ID IS #1111
```

CNV

Convert Number Or String To Another Form

The CNV Directive will accept for conversion, a string of ASCII characters in one of several accepted formats. The accepted number will then be converted into all other acceptable forms and printed on the following line. The result will appear in hexadecimal format, decimal format, and CAN-code format. This directive can also be used to convert between FORTRAN decimal statement numbers and their corresponding base 26 assembler symbol names.

SYNTAX

/CNV standardstring

standardstring (REQUIRED) Parameter 1 can appear as any of the following forms:

[-]#xxxx	Hexadecimal number with 1- to 4-hex digits "x"
[-]xxxxx	Decimal number with 1- to 5-decimal digits (32,767 maximum)
@ccc	CAN-code character string with 1- to 3-characters
"aa"	One or two character ASCII string
$nnnnn	Decimal FORTRAN statement number
XXXX:	Alphabetic assembler base 26 symbol name

EXAMPLES

```
/CNV #FFFF
```

Causes the following report to be generated.

```
-1 #FFFF NOCAN
```

```
/CNV @ A
```

Causes the following report to be generated.

```
+1 #0001 @ A
```

```
/CNV +2
```

Causes the following report to be generated.

```
+2 #0002 @ B
```

/CNV $100

Causes the following report to be generated.

AADW:

/CNV AADW:

Causes the following report to be generated.

100

COM

Display/Modify The Communications Parameters For A 1907 Compatible Communications Device Or MAXNET Link

---

```
[/tname] /COM device    [ BAU[DRATE]          baud-rate          ]
                        [ ECH[O]              HAR[D]             ]
                        [                     SOF[T]             ]
                        [                     NO[ECHO]           ]
                        [ PAR[ITY]            ODD                ]
                        [                     EVE[N]             ]
                        [                     NON[E]             ]
                        [ STO[PBITS]          1                  ]
                        [                     2                  ]
                        [ NUL[LS]             number-of-nulls    ]
                        [ WAT[CHDOG]          low-clock-ticks    ]
                        [ FRA[MESIZE]         5                  ]
                        [                     6                  ]
                        [                     7                  ]
                        [                     8                  ]
                        [ SYN[CCHARACTER]     hex-byte           ]
                        [ REC[ORDSIZE]        number-of-bytes    ]
                        [ INF[LUENCELIMIT]    number             ]
                        [ EXC[LUSIVEUSE]      [taskname]         ]
                        [ MOD[E]              CUR[RENTLOOP]      ]
                        [                     RS2[32]            ]
                        [ LIS[TCONTROL]       ON                 ]
                        [                     OFF                ]
                        [RIN[G]               BUS[Y]             ]
                        [                     NOT[BUSY]          ]
```

The COM Directive allows the system operator to display or modify the communications parameters of a 1907 compatible communications device. (A 1907 compatible communications device is a non-AFD device connected to one of the following controllers: 4804, 4806, 4807, 4858, 1907, 1907A, 1907B, or 1908.) Additionally, COM allows the display of MAXNET link devices (for which parameters cannot be modified). If no device name parameter is specified, communications parameter information for all such communications devices is displayed. If only a device name parameter is specified, communications parameter information is displayed for the specified device only.

NOTE: Information for certain devices that resemble 1907 compatible communications devices can be displayed with inapplicable information and should be ignored. (Example: 3271 emulator devices.)

Individual options of the COM command are described below.

[/tname] /COM device BAU[DRATE] baudrate

This format allows the operator to change the baud rate of the specified asynchronous 1907 device. The baud-rate parameter can take on one of the following baud rates: 75, 110, 134 (indicating a true baud rate of 134.5), 150, 300, 600, 1200, 1800, 2000, 2400, 3600, 4800, 7200,

9600, or 19.2 (indicating a baud rate of 19.2K). If the keyword EXTERN[AL] is used in place of the baud-rate parameter then clocking will be performed by external modem control.

[/]/COM device ECH[O]	HAR[D]
	SOF[T]
	NO[ECHO]

This format allows the operator to change the presence and type of echo on the specified 1907 device. If the keyword HARD is given, then the hardware in the communications controller will be used to perform the echo function. If the keyword SOFT is given, then the handler will perform the echo function. If the keyword NOECHO is given, then no hardware or software echo will be supplied.

[/]/COM device PAR[ITY]	ODD
	EVE[N]
	NON[E]

This format allows the operator to change the presence and type of parity to be generated/checked by the 1907 compatible controller. If the keyword ODD is given, then odd parity will be generated on output and odd parity will be checked on input. If the keyword EVEN is given, then ever parity will be generated and checked. If the keyword NONE is given, then no parity generation or checking will take place.

[/]/COM device STO[PBITS]	1
	2

This format allows the operator to change the number of stop bits required for the specified asynchronous 1907 device.

[/]/COM device NUL[LS]	number-of-nulls

This format allows the operator to change the number of NUL characters to be output to the specified 1907 device prior to each message.

[/]/COM device WAT[CHDOG]	low-clock-ticks

This format allows the operator to change the maximum time in low clock ticks that an operation to the specified 1907 device is allowed to stay at the head of the controller queue. This format has no meaning if the device was SYSGENed UNTIMED.

[/]/COM device FRA[MESIZE]	5
	6
	7
	8

This format allows the operator to change the data character (frame) size in bits of the specified 1907 device.

[/]/COM device SYN[CCHARACTER] hex-byte

This format allows the operator to change the sync character for the specified synchronous 1907 device.

[/]/COM device REC[ORDSIZE] number-of-bytes

This format allows the operator to change the natural block size (bytes per record) of the specified 1907 device.

[/]/COM device INF[LUENCELIMIT] number

This format allows the operator to change the influence limit of the specified 1907 device. The influence limit is a number between 0 and 255 which specifies that only tasks having an influence limit that is less than or equal to the value specified will be permitted to use the specified 1907 device.

[/]/COM device EXC[LUSIVEUSE] [taskname]

This format allows the operator to change or remove the designated task which has (will have) permanent exclusive use of the specified 1907 device. The taskname parameter is a 1- to 6-character CAN-code name of a task which is required to have permanent exclusive use of the specified 1907 device. If the taskname parameter is omitted, then no task will have permanent exclusive use of the specified 1907 device.

[/]/COM device [MOD[E] CUR[RENTLOOP]
RS2[32]

The format allows the operator to change the mode of interface used for the specified 1907 device.

[/]/COM device LIS[TCONTROL] ON
OFF

This format allows the operator to change the Terminal Listing Control option of the specified asynchronous 1907 device.

[/]/COM device RIN[G] BUS[Y]
NOT[BUSY]

This format allows the operator to change the state of the Busy-Out modem signal of the specified 1907 device. If the keyword BUSY is given, then the Busy-Out signal will be set to active which causes a rotary device to ignore this channel (effectively excludes the channel from receiving a RING signal). If the keyword NOTBUSY is given, then the Busy-Out signal will be set to inactive which returns the channel to a **normal** state.

EXAMPLES

//COM AAA BAU 9600	- Change the baud rate for AAA to 9600
//COM AAA ECH NOECHO	- Change the echo for AAA to no echo
//COM AAA PAR EVEN	- Change the parity for AAA to even parity
//COM AAA STO 1	- Change the number of stop bits for AAA to 1
//COM AAA NUL 3	- Change the number of nulls output to AAA to 3
//COM AAA WAT 256	- Change the watchdog timer for AAA to 256 low clock ticks
//COM AAA FRA 8	- Change the character size for AAA to 8 bits
//COM SAA SYN #16	- Change the sync character for SAA to #16
//COM AAA REC 72	- Change the record size of AAA to 72 bytes
//COM AAA INF 100	- Change the influence limit for access to AAA to 100
//COM AAA EXC	- Remove any permanent exclusive use from AAA
//COM AAA MOD CURRENTLOOP	- Change the interface mode for AAA to current loop
//COM AAA LIS ON	- Allow AAA to use the Terminal Listing Control Option
//COM AAA RIN NOTBUSY	- Allow RING to occur on AAA
//COM	- Display communications parameter information for all communications devices
//COM AAA	- Display communications parameter information for device AAA

CONNECT (INTERRUPTS)

Schedule My Task To Be Activated, Resumed, Or Killed When Interrupt Requests

---

The CONNECT (INTERRUPTS) Directive specifies the action to be performed on the attentive task when requested by the interrupt. The specified hardware interrupt level is allocated and connected to perform the delayed service for the attentive task (tname). The possible service can be ACTIVATE, KILL, or RESUME. If the request is for an ACTIVATE service and if the task is nonresident and not prequeued, currently ACTIVE, or ESTABLISHED, a new TCB is queued at the specified priority level (unless a priority level was specified at cataloging time). Parameters 2-6 can follow in any order and all are optional. Default values are used when not specified.

SYNTAX

```
                          1          2
[/tname]/CON[NECT]      level  [ [ACT[IVATE]]        ]
                               [ [RES[UME] ]         ]
                               [ [KIL[L]   ]         ]

                                    3
                               [PRI[ORITY] level     ]

                                    4
                               [FIL[E] filename      ]

                                    5
                               [PER[IODIC]           ]
```

level	(REQUIRED) Parameter 1 is the interrupt level (7, 8, 9, A, B) or pseudo interrupt level (#20-#FF) to be connected to the task.
[ACT[IVATE]] [RES[UME] [KIL[L]	(OPTIONAL) Parameter 2 is one of these three keywords that selects the action to be performed on the attentive task. (Default = ACTIVATE.)
[PRI[ORITY] level]	(OPTIONAL) Parameter 3 specifies a priority that the attentive task uses as an execution priority if the ACTIVATE action is used and if the task's priority was not already bound at cataloging time. (Default = 255 or the value cataloged with the task.)
[FIL[E] filname]	(OPTIONAL) Parameter 4 specifies a logical file name to be used to load the cataloged task if the ACTIVATE action is used. (Default= File "LM".)

[PER[IODIC]] (OPTIONAL) Parameter 5 specifies that the interrupt is **periodic,** which causes it to stay enabled upon each request of the interrupt. (Default = Interrupt occurs once and is disabled (and possibly disconnected) after the first interrupt request.) (Refer to THAW.)

EXAMPLE

```
/XYZ/CONNECT 7 ACT
```

Connect task XYZ to interrupt level 7. When level 7 triggers, ACTIVATE specified task.

CONNECT (TIMERS)

Schedule My Task To Be Activated, Resumed, Or Killed When Timer Expires

---

The CONNECT (TIMERS) Directive causes a timer scheduler to be allocated for purposes of performing some subsequent action on the attentive task. The action is performed on this task when the timer expires (once or periodically). Either an ACTIVATE, RESUME, or KILL action will be performed. Parameters 2-6 can follow in any order and all are optional. Default values are used when not specified and all are optional.

SYNTAX

```
                                  1          2
[tname]/CON[NECT] TI[MER]  [[ACT[IVATE]]
                           [ [RES[UME] ]
                           [ [KIL[L]  ]

                              3
                           [PRI[ORITY] level ]

                              4
                           [FIL[E] filname ]

                              5
                           [I [timoday ] ]
                           [IE [elapstime] ]

                              6
                           [P [timoday ] ]
                           [PE [elapstime] ]
```

TI[MER] (REQUIRED) Parameter 1 allocates a timer scheduler.

[ACT[IVATE]]
[RES[UME]]
[KIL[L]] (OPTIONAL) Parameter 2 is one of these three keywords select the action to be performed on the attentive task. (Default = ACTIVATE.)

[PRI[ORITY] level] (OPTIONAL) Parameter 3 specifies a priority that the attentive task will use as an execution priority if the ACTIVATE action is used, and if the task's priority was not already bound at cataloging time. (Default = 255 or the value cataloged with the task.)

[FIL[E] filname] (OPTIONAL) Parameter 4 specifies a logical file name to be used to load the cataloged task. (Default = File "LM" if the ACTIVATE action is used.)

[I timoday]
[IE elapstime] (OPTIONAL) Parameter 5 specifies one of the following:

I timoday specifies that the initial expiration of the timer will be at a specific time-of-day. The time of the first action will be at the first occurence of the specified time-of-day, after the timer is thawed.

IE elapstime specifies that the initial expiration of the timer will be a specified elapsed timer after the timer is enabled (thawed). An elapsed time of zero ticks (immediately) is used when neither the "IE" nor the "I" parameter string is included.

[P timoday]
[PE elapstime] (OPTIONAL) Parameter 6 specifies one of the following:

P timoday specifies that the timer is periodic and also specifies the time period in time-of-day format. After an initial timer expiration (specified with I or IE), the period will become 24 hours but phased at the specified time-of-day.

PE elapstime specifies that the timer is periodic and specifies the period in elapsed time format. After an initial timer expiration (specified with I or IE), the period will become the specified value.

NOTE: [[[hr]min]tick] is the format of any time value entry used with the I, IE, P, and PE keyword strings above. If the value is less than a minute, only ticks need be specified; if less than an hour, only minutes and ticks need be specified.

EXAMPLE

```
/XYZ/CON T!
```

Connect task XYZ to an available timer, initial elapsed = 1 second; periodic elapsed = 5 second; function = activate.

CPD

Change Partition Definition

The CPD Directive changes the definition of a BIOS or File Manager disc partition that is either globally or locally assigned to the Batch or OC task.

SYNTAX

[/tsknam]//CPD lfn [strk] [ntrks] [rsl] [geo]

lfn (REQUIRED) Parameter 1 must be a logical file name assigned to the partition to be modified.

[strk] (OPTIONAL) Parameter 2 is the new starting track of the partition. If omitted, starting track is not changed.

[ntrk] (OPTIONAL) Parameter 3 is the new number of tracks of the partition. If omitted, number of tracks is not changed.

[rsl] (OPTIONAL) Parameter 4 is the new record size limit of the partition. If omitted, record size limit is not changed.

[geo] (OPTIONAL) Parameter 5 is the new geometry of the partition. If omitted, geometry is not changed.

NOTE: Validity of desired geometry should be verified by consulting the DISC DEVICE LDT description in the Data Structures manual.

The user must check for file contiguity of any File Manager partitions that will be changed with the CPD Directive.

EXAMPLE

```
/taskname/ASS BI BSB
/CPD,BI,,,0,1
```

Change the partition assigned to BI to record size limit 0, geometry 1.

Display Actual Memory Regions And Named Global Common Regions

The TAC and DAC memory display directives bypass all virtual addressing schemes and display information directly as contained on actual memory pages. In particular, large global common memory areas belong to the class of such memory areas and can be requested by name. TACTUAL outputs to the CO file; DACTUAL outputs to the DO file.

SYNTAX

```
/TAC[TUAL]  {pagenumber}  wordispl  [numwords]  [DE [CIMAL ]]
/DAC[TUAL]  {globalname}            [          [NO [SUPPR ]]
                                    [          [AS [CIICAN]]
                                    [          [HE [ADER  ]]
```

{pagenumber} {globalname} — (AT LEAST ONE IS REQUIED) Parameter 1 can be any actual page number or the name of a global shared (common) region. In the latter case, the name is replaced by the actual starting page associated with the global region if it is found in the system's directory of such shared memory regions. The output will be relative to, but not necessarily confined to, the resultant page number.

wordispl — (REQUIRED) Parameter 2 is the word displacement relative to the selected page where the display will start. Task and subroutine bias will be added if preceded by a $. Positive displacements (0 to #7FFF) address progressively higher memory words relative to the selected page. Negative displacements (#FFFF to #8000) address progressively lower memory words relative to the selected page. Positive displacements address individual words of the global region and can be thought of as **subscripts.**

[numwords] — (OPTIONAL) Parameter 3 specifies the total number of words to be displayed. (Default = One word.)

[DE[CIMAL]] - Causes the display of all values to be in decimal format instead of hexadecimal format. This keyword can appear anywhere after Parameter 2.

[NO[SUPPR]] - Causes the display to not suppress lines containing like values. This keyword can appear anywhere after Parameter 2.

[AS[CIICAN]] - Causes a report to be appended to the right of the output with the ASCII and CAN-code equivalents for the hexadecimal values.

[HE[ADER]] - Causes the time and date to be printed at the top of the report.

If any regions of the specified display fall into nonexistent memory areas, the resulting displayed quantities will usually be zero -- although wraparound will occur at the extremes of actual memory addresses (0 and page #1FFF).

EXAMPLES

```
/TAC #200 0 256 DECIMAL
```

Displays the contents of page #200 in decimal on the CO file.

```
/DAC BIGCOM 15
```

Print Word 15 of the global common block named BIGCOM on the DO file.

```
/DAC 0 #100 512 NO
```

Print the contents of the actual Pages 1 and 2 with no suppression of like-value lines on the DO file.

Set Or Get The Date

The DAT Directive can be used to get the current DATE/TIME maintained by the system's Time-of-Day clock, or to set the Date portion of the DATE/TIME STAMP. Only valid months, days, or years will be accepted -- except that the year can be entered in a two-digit format (that is, 83 can be entered instead of 1983) in which case 1900 is added to the date.

SYNTAX

```
/DAT[E]     [month]  [day]    [year]
            [day]    [month]
```

When no parameters are entered, the current date/time is printed on the line following the directive.

[month]
[day] (OPTIONAL) Parameter 1 represents either a month or a day depending on how parameters 1 and 2 are entered.

To represent a month in parameter 1, parameter 2 must be a numeric day value in the range of 1 to 31. Valid month values for parameter 1 range from 1 to 12.

To represent a day in parameter 1, parameter 2 must be a value from the set: JAN, FEB, MAR, APR, MAY, JUN, JUL, AUG, SEP, OCT, NOV, DEC. The day value for parameter 1 must be within the range of 1 to 31.

[day]
[month] (OPTIONAL) Parameter 2 represents either a day or month.

To represent a day, it must be a numeric value from 1 to 31.

To represent a month, it must be alphabetic from the set: JAN, FEB, MAR, APR, MAY, JUN, JUL, AUG, SEP, OCT, NOV, DEC.

[year] (OPTIONAL) Parameter 3 identifies the year.

EXAMPLES

```
/DATE 12/25/82
```

Set date to "Christmas."

```
/DAT 12 25 1982
```

Set date to "Christmas."

```
/DAT     7,4,83
```

Set date to "United States Independence Day."

```
/DIS DAT
```

Print date on DO file in date/time format:

```
12 JUN 84 12:30:15.
```

Displays LIM Card Memory

The DCD Directive can be used for diagnostic purposes to display the LIM card's memory. DCD causes the SIO Loader task to be activated. The SIO Loader issues a REX READ with the UDW bit set when a dump of the memory on the LIM is desired. As in the load, the -1 word of the UFT contains the loader options. Words -2 and -3 contain the starting address of the dump. The Block MUX Handler issues a command to the controller requesting a halt of the LIM and a memory dump. The SIO Loader reads all of the memory from the appropriate card and dumps it to the DO file. The dump is hexadecimal format with the ASCII and CAN-code conversions appended to the right of the dump. If an error occurs, no retries are attempted, and the operator must reissue the DCD Directive. A LIM card is nonoperational after a dump and must be reloaded using the LCD Directive before it can be used for I/O again.

SYNTAX

```
//DCD   #gu,slotnum

  or

//DCD   dname
```

#gu (REQUIRED) Parameter 1 represents the DCS controller's group and unit number for the card whose memory is displayed.

slotnum (REQUIRED) Parameter 2 represents the slot number of the card whose memory is to be displayed.

or

dname (REQUIRED) Parameter 1 represents the logical device name of a channel on the card whose memory is to be displayed.

EXAMPLES

```
//DCD A16
```

Display memory for card associated with logical device A16.

```
//DCD 5,15
```

Display card memory for group/unit number 5, slot number 15.

DCI

Reassign My Task's CI File And Abort Me

The DCI Directive can be used for BATCH tasks only. It is used to reassign the attentive task's CI file to the specified logical device and ABORT the task with the reason DCI OC.

SYNTAX

[/tname]/DCI {ldev} {lfn}

{ldev} {lfn} (AT LEAST ONE IS REQUIRED) Parameter 1 is the new logical file or logical device assignment for CI file.

EXAMPLES

/B/DCI TY

Assign CI to TY (logical file) for B task and then ABORT the task.

/B/DCI TY5

Assign CI to TY5 (logical device) for B task and then ABORT the task.

Make My Established Task No Longer Resident

The DEESTABLISH Directive makes an established task no longer resident. The attentive task (tname), if currently active, is set in the nonresident state if it was previously established. If not active, it is set nonresident and is aborted to force it to exit the system. If the task is permanently resident, it ignores this directive. A task cannot be deestablished if its influence level is higher than that of the OC task.

SYNTAX

[/tname]/DEE[STABLISH]

EXAMPLE

/XYZ/DEE

Make task XYZ not resident.

DEL

Set Or Check OC Task Delay Timer

The DEL Directive with parameters present starts the OC task's delay timer. If no parameters are present it will return the time remaining if the OC task's delay timer is running. If there is no delay timer running, the word "EXPIRED" is output. The "TILL" parameter specifies delay until the time past zero specified has been reached otherwise elapsed time is used. The "RETURN" parameter specifies not to suspend the OC task while the delay timer is running. For more information, refer to the DELAY service the MAX IV Executive (REX) Services, System Guide Manual.

SYNTAX

[/tname]/DEL[AY] [TI[LL]] minutes, ticks [RE[TURN]]

EXAMPLES

/DEL

Prints remaining delay time.

/DEL TILL 120,0

Delays until 0200 hours.

/DEL 1,0

Delays one minute elapsed time.

/DEL 5,0 RETURN

Start Quick Return delay of five minutes.

Print List Of System Devices

The DEV Directive lists either specific system devices or a class of system devices.

SYNTAX

```
[/tname]/[/]DEV     [devicename]
                    [class    ]
                    [*lfn     ]
```

[devicename] (OPTIONAL) Parameter 1 is either a device name or device class name.
[class] (Default = A report of all system devices is produced.)
[*lfn]

devicename represents a 3-character legal device name. If supplied, a report for only this specific device will be produced.

class represents a 4-character device class name as follows:

[DISC]	If supplied, a report for all disc devices, grouped by physical and then logical transports, is produced.
[IMAG]	If supplied, a report for all imaginary system devices and their related symbionts is produced.
[UNIT]	If supplied, a report for all unit-record devices (card equipment and printers) is produced.
[MAGT]	If supplied, a report for all magnetic tape devices is produced.

***lfn** specifies the logical file name which is assigned to the device.

DEFINITION OF REPORT MNEMONICS

MNEMONIC	DEFINITION
PTRA	Three-character physical pack transport name
HPK#	Hardware transport number belonging to pack transport
GRP#	Group number part of physical device address
UNIT	Unit number part of physical device address
DMP#	Direct Memory Processor (DMP) channel number
S/TR	Sectors per track
W/SC	Number of words on a disc sector
T/CY	Number of tracks per cylinder
C/PK	Number of cylinders per transport
LDTS	Logical device status word
RECZ	Maximum record size in words
LPRI	Limit priority access restrictions
EXLW	Exclusive-use password
GEOM	Device geometry (disc devices)
OPTW	Device-dependent options and other status
STRK	Starting track of a disc device
#SEC	Number of sectors of a disc device
NAME	Three-character device name or real file name
TNP#	Transport number (magnetic tape devices)
WDOG	Watchdog timing word
LTRA	Logical transport name (disc device)
STR#	Starting track of logical transport
TRKS	Number of tracks on logical transport
OPTN	Device-dependent options and other status

EXAMPLES

```
/DIS DEV *TY
     NAME = A16      CLAS =PRINTER     GRP# = 1        UNIT = 8
LDTS = 0000      RECZ = 0
LPRI = 255       EXLW =     0C
OPTN = 0224      WDOG = 0

/DIS DEV *SI
      PTRA = H01    HPK# = 1     GRP# = 0
      UNIT = 3      DMP# = 3     W/SC = 128
      S/TR = 64     T/CY = 5     C/PK = 823

   LTRA = U1    STR# = 0    TRKS = 4115

   NAME = UNIX:DOC:/USL
LDTS = 0080      RECZ = 128
LPRI = 255       EXLW =
GEOM = 1         OPTW = 0401
SDPI = 40964     #SEC = 3840
```

Display/Type A System (Or Task) Information Report

The TYPE OC Directive causes the output of an OC Directive to go to the global CO file. This is the default. The DISPLAY OC Directive causes the output of an OC Directive to go to the global DO file. This can be used with any OC Directive to obtain a printed copy of the output.

SYNTAX

```
/DIS[PLAY]      [OC Directive Name]
/TYP[E]
```

EXAMPLES

```
/DIS   DAT
```

Displays /DAT Directive output to the DO file.

```
/TYP   DAT
```

Has the same result as typing /DAT.

ECM

Display Or Modify Plane Status For Error Correcting Memory

The ECM Directive allows the system operator to enable or disable the error correcting hardware mode and to obtain a summary listing of past errors on a per memory plane basis on a MODCOMP CLASSIC 78xy CPU. If the CPU is a CLASSIC 32/85, error correcting memory is always enabled and there is no memory interleaving.

SYNTAX

[/tname]/ECM [ON] [actual-address]
[OF[F] [$module-id]

[ON]
[OF[F]] (OPTIONAL) Parameter 1 represents error correction mode. (Default = Only current plane information for the specified plane is returned.)

ON turns error correction mode on for the specified plane.

OFF turns error correction mode off for the specified plane.

[actual-address]
[$module-id] If Parameter 2 is not specified all planes are affected in the manner specified by Parameter 1.

If Parameter 2 is a numeric value, it indicates the actual address of a word. That word is contained within the plane to be affected.

If Parameter 2 is preceded by a '$' it indicates the module-id number of the plane, which is to be affected.

EXAMPLE

```
/ECM
```

This form of the directive requests a listing of the plane status for all planes. A sample report follows. The "TOTAL ERRORS" value indicates the total number of memory errors that have occurred since startup.

```
TOTAL ERRORS= 0
ADDP=#000000  PSR0=#1A41  ID=#00  32K SS   OFF 4 WAY  ERRORS = 0
ADDR=#000001  PSR0=#1A49  ID=#01  32K SS   OFF 4 WAY  ERRORS = 0
ADDR=#000002  PSR0=#1A51  ID=#02  32K SS   OFF 4 WAY  ERRORS = 0
ADDR=#000003  PSR0=#1A59  ID=#03  32K SS   OFF 4 WAY  ERRORS = 0
ADDR=#020000  PSR0=#1764  ID=#04  32K COR  OFF 2 WAY  ERRORS = 0
ADDR=#020001  PSR0=#136C  ID=#05  32K COR  OFF 2 WAY  ERRORS = 0
\_________/   \_________/  \____/  \_____/ \_/ \___/  \________/
     |             |          |        |     |   |         |
address of first   |      module id    |  current  |  number of
word in plane      |      of plane     |  state of |  parity errors
                   |                   | correction|  that have
                   |                   |           |  occurred in
                   |                   |           |  plane.
current contents of plane          type of     interleave
status register 0                  plane       mode for plane
```

/ECM ON 5

This form of the directive turns correction on for the plane that contains actual address 5. A sample report follows.

```
ADDR=#000001 PSR0=#3A49 ID=#01 32K SS ON 4 WAY ERRORS = 0
```

/ECM ON $1

This form of the directive turns correction on for plane 1. A sample report follows.

```
ADDR=#000001 PSR0=#3A49 ID=#01 32K SS ON 4 WAY ERRORS = 0
```

/ECM $2

This form of the directive obtains information about plane 2. A sample report follows.

```
ADDR=#000002 PSR0=#1A51 ID=#02 32K SS ON 4 WAY ERRORS = 0
```

/ECM OFF

This form of the directive turns correction off for all planes and outputs the following report.

```
ADDR=#000000  PSR0=#1A41  ID=#00  32K SS   OFF 4 WAY  ERRORS = 0
ADDR=#000001  PSR0=#1A49  ID=#01  32K SS   OFF 4 WAY  ERRORS = 0
ADDR=#000002  PSR0=#1A51  ID=#02  32K SS   OFF 4 WAY  ERRORS = 0
ADDR=#000003  PSR0=#1A59  ID=#03  32K SS   OFF 4 WAY  ERRORS = 0
ADDR=#020000  PSR0=#1764  ID=#04  32K COR  OFF 2 WAY  ERRORS = 0
ADDR=#020001  PSR0=#136C  ID=#05  32K COR  OFF 2 WAY  ERRORS = 0
```

/ECM ON $6

This form of the directive requests error correction be turned on for plane 6. The following response (an up arrow) indicates that plane 6 is non-existant.

```
↑
```

ESTABLISH

Make My Nonresident Task Resident And Loaded Until Further Notice

---

The ESTABLISH Directive makes nonresident tasks resident and loaded. If the attentive task (tname) is permanently resident, no operation is performed. If it is nonresident but currently active, its status is set **resident** so that any subsequent exit or abort maintains the task in a resident state. If the task is not in memory, it has a TCB allocated at the specified (or cataloged) priority level or the default priority level (255), and it is activated long enough to become loaded from the specified file (or default file LM). It is then set resident but inactive and is not executed until it is subsequently activated (refer to ACTIVATE command). The priority argument is ignored if the task's TCB is already in the CPUQ due to scheduling or if a priority level is specified at cataloging time. A task cannot be established if its influence level is higher than that of the OC task.

SYNTAX

[/tname]/EST[ABLISH] [priority] [file]

[priority] (OPTIONAL) Parameter 1 is the default desired priority level of the task if it is not already in the system and did not have its priority level fixed when cataloged.

[logfile] (OPTIONAL) Parameter 2 is the logical file from which the task should be loaded (assumed to be global) if it is not already in the system.

EXAMPLE

```
/XYZ/EST 200 LM
```

Load task XYZ from LM, make it resident, and set its priority at 200.

Pass An Event To The Optional Event Logging Facility

The EVE Directive allows the operator to pass an event to the optional Event Logging facility by the Event Logging REX Service. The arguments will be concatenated into a data buffer that is sent to Event Logging. The number and type of arguments is governed by the format number. There is no cross-checking with the format number to ensure that the proper number and type of arguments are passed. Refer to "EVENT LOGGING", a chapter in the MAX IV GENERAL OPERATING SYSTEM, System Guide for an explanation of the format file and format numbers.

SYNTAX

/EVE[LOG] [ECH[O]] [IMP[ATIENT]] [PAT[IENT]] FORMATNUMBER [ARGUMENTS...]

[ECH[O]]
[IMP[ATIENT]]
[PAT[IENT]]

(OPTIONAL) Parameter 1 is one of the following:

ECHO specifies that echoing to the formatted message file is to be specified in the logging node.

IMPATIENT specifies that logging node availability impatience is to be indicated in the request.

PATIENT specifies that logging node availability impatience is not to be indicated in the request.

FORMATNUMBER

(REQUIRED) Parameter 2 is the logging node type number (format number) that is to be passed with request.

[ARGUMENTS...]

(OPTIONAL) Parameter 3 specifies one or more values that are to be included as specific data in the EVENT LOGGING NODE. They can take on any of the following forms:

- n - A 16-bit signed decimal number.
- #hhhh - A 16-bit hexadecimal number.
- @ccc - A one-to-three character CAN-encodable value not containing intervening spaces.
- "xxx...xxx" - An ASCII string.

  If the string delimiter is to be included as a character in the string, then it must be entered twice. Strings are stored starting with the left byte of the next word in the node. The string will be terminated by one

or two null bytes depending upon the byte position of the last character.

EXAMPLE

```
/EVE ECHO 129 #1234 @ABC -47 'HOW"S' "THAT"
```

Pass event format number 129 to the Event Logging facility. If the Event Logging formatted messages option is configured and enabled, it will be formatted to the currently defined formatted messages logical file. There will be nine words of event specific data. First will be a word containing the hexadecimal value 1234. Second will be the CAN-encoded value ABC. Third will be the negative decimal value 47. Next will be a three-word string containing an apostrophe. Finally there will be a three-word string.

Print Only The EXT Of The Attentive Task

The EXT Directive prints only the EXT part of the attentive task's TCB. This section is usually mapped into MAP 0 only when the attentive task is the currently running task.

SYNTAX

[/tname]/EXT

EXAMPLE

/EXT

```
EXT(009C) 0000 0001 9F8E 0001 0000 0004 F950 F6D9 /0C
EXT(00A4) 0000 0000 F93B F910 0000 151E 0000 0000 /0C
EXT(00AC) 0000 0000 0007 F931 0000 0000 09A0 F676 /0C
EXT(00B4) 0000 F675 879D 0000 0C1E 0000 4400 0C1E /0C
EXT(00BC) 0000 099F F90E 0000 775B 0000 0000 0001 /0C
EXT(00C4) F6CF F6C7 F600 F675 F696 0016 0000 0000 /0C
EXT(00CC) 0000 0000 F900 F90E F910 001A 0000 0000 /0C
EXT(00D4) 0000 0000 0000 0000 0000 0000 0C3F 0CFF /0C
EXT(00DC) FF00 0E88 0C80 0000 0007 0000 0C3F 0CFF /0C
EXT(00E4) FF00 0080 0000 0000 00ED 04EA 0000 0000 /0C
EXT(00EC) 0000 0000 0000 0000 0000 0000 0000 0000 /0C
EXT(00F4) 0000 0000 0000 F6FA F7FF F8FF F9FF FA9A /0C
EXT(00FC) 0000 0000 0000 F800 /0C
```

FAT

Print Contents Of Attentive Task's File Assignment Table

The FAT Directive prints the contents of the attentive task's logical file list and file assignment table entries. In addition, when this is a File Manager FAT, the associated logical device table (LDT) will also be printed.

SYNTAX

[/tname]/FAT[S] [NOS]

[NOS] (OPTIONAL) Parameter 1 indicates that strings of zero value in the map image should not be suppressed.

EXAMPLE

/FAT

```
*LOGICAL FILE LIST*
TBL(0050) 0029 F97B F982 F989 F990 F997 F99E F9A5 /0C
TBL(0058) F9AC F9B3 F9BA F9C1 F9C8 F9CF F9D6 F9DD /0C
TBL(0060) F9E4 F9EB F9F2 F9F9 FA00 FA07 FA0E FA15 /0C
TBL(0068) FA1C FA23 FA2A FA31 FA38 FA3F FA46 FA4D /0C
TBL(0070) FA54 FA5B FA62 FA69 FA70 FA77 FA7E FA85 /0C
TBL(0078) FA8C FA93 /0C
FAT(007B) 40C0 1428 0000 1944 1944 0000 0005 /0C
FAT(0082) 40C0 4D58 0000 1944 1944 0000 0000 /0C
FAT(0089) 40C0 1518 0000 1944 1944 0000 0005 /0C
FAT(0090) 4000 3DF8 0000 0A58 0A58 0000 0000 /0C
FAT(0097) 4000 4FD8 0000 0AA6 0AA6 0000 0000 /0C
FAT(009E) 4000 7739 0000 0ADA 0ADA 0000 0000 /0C
FAT(00A5) 4000 773A 0000 0AE7 0AE7 0000 0000 /0C
FAT(00AC) 4000 7738 0000 0ACD 0ACD  000 0000 /0C
FAT(00B3) 40C0 7828 0000 1944 1944 0000 0000 /0C
FAT(00BA) 4000 7918 0000 0AE7 0AE7 0000 0000 /0C
FAT(00C1) 4000 0DE8 0000 0ADA 0ADA 0000 0000 /0C
FAT(00C8) 4000 0ED8 0000 0ADA 0ADA 0000 0000 /0C
FAT(00CF) 4000 8644 0000 0AB3 0AB3 0000 0000 /0C
FAT(00D6) 4000 773B 0000 0AC0 0AC0 0000 0000 /0C
FAT(00DD) 40C0 07A8 0000 1944 1944 0000 0000 /0C
FAT(00E4) 4000 51B8 0000 0A99 0A99 0000 0000 /0C
FAT(00EB) 40C0 AF00 0000 1944 1944 0000 0000 /0C
FAT(00F2) 4000 B540 0000 096B 096B 0000 0000 /0C
FAT(00F9) 4000 BB80 0000 09C4 09C4 0000 0000 /0C
FAT(0000) 4000 929B 0000 0AC0 0AC0 0000 0000 /0C
FAT(0007) 4000 2795 0000 0A99 0A99 0000 0000 /0C
FAT(000E) 4000 2788 0000 0A8C 0A8C 0000 0000 /0C
FAT(0015) 4000 70AC 0000 1317 1317 0000 0000 /0C
FAT(001C) 40C0 3EF8 0000 F9CF F9CF 0000 0000 /0C
```

```
FAT(0023) 4000 4218 0000 0AF4 0AF4 0000 0000 /0C
FAT(002A) 4000 8520 0000 0B0E 0B0E 0000 0000 /0C
FAT(0031) 0000 0000 0000 0000 0000 0000 0000 /0C
FAT(0038) 0000 0000 0000 0000 0000 0000 0000 /0C
FAT(003F) 0000 0000 0000 0000 0000 0000 0000 /0C
FAT(0046) 0000 0000 0000 0000 0000 0000 0000 /0C
FAT(004D) 0000 0000 0000 0000 0000 0000 0000 /0C
FAT(0054) 0000 0000 0000 0000 0000 0000 0000 /0C
FAT(005B) 0000 0000 0000 0000 0000 0000 0000 /0C
FAT(0062) 0000 0000 0000 0000 0000 0000 0000 /0C
FAT(0069) 0000 0000 0000 0000 0000 0000 0000 /0C
FAT(0070) 0000 0000 0000 0000 0000 0000 0000 /0C
FAT(0077) 0000 0000 0000 0000 0000 0000 0000 /0C
FAT(007E) 0000 0000 0000 0000 0000 0000 0000 /0C
FAT(0085) 0000 0000 0000 0000 0000 0000 0000 /0C
FAT(008C) 0000 0000 0000 0000 0000 0000 0000 /0C
FAT(0093) 0000 0000 0000 0000 0000 0000 0000 /0C
```

FCB

Print Contents/Virtual-Address/Actual-Address Of Attentive Task's File Manager File Control Block

---

The FCB Directive prints the contents of the attentive task's FCB identified by the specified logical file name (lfn). If the optional question mark (?) parameter is specified or the FCB is not in virtual MAP 0 only the actual page address is printed.

SYNTAX

[/tname]/FCB {lfn | *lfn} [?]

{lfn | *lfn} (AT LEAST ONE IS REQUIRED) Parameter 1 identifies the logical file name.

[?] (OPTIONAL) Parameter 2 inhibits the File Manager from printing the hex data portion of the display.

EXAMPLE

/DIS FCB *SI

```
FCB LEN: U$S     VIRTUAL ADDRESS:  #0000        ACTUAL PAGE: #D9BD
FILE: UNIX:DOC:/USL
U$S(0000) 09C5 0000 0056 0000 1785 0000 0026 FFFF 0000 3070 461C 4000 0001 F44E 40FB 3FFC /OC
U$S(0010) 0C1F 5FC4 0801 F44E 0000 0000 0000 0000 0000 0000 09F4 0A21 0000 0000 0000 0000 /OC
U$S(0020) 0000 0EFE 8000 0000 0001 F402 0000 0000 0000 0103 0000 0004 0000 0000 0000 0000 /OC
U$S(0030) 0000 0000 FF00 0004 0000 0000 0004 0001 0000 0000 0000 0000 0000 0000 0000 0000 /OC
U$S(0040) 0000 03C0 0000 0000 0F00 0BFF 0DA7 0000 0000 0000 0000 0000 0000 0000 0000 0000 /OC
U$S(0050) 0000 0000 0000 0000 0000 0000 554E 5855 5352 0000 0000 0000 0000 0000 0000 0000 /OC
U$S(0060) 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0001 /OC
U$S(0070) F44D 0000 0000 0000 0000 87A0 0000 0000 0000 0000 0000 0000 0000 0000 0001 F403 /OC
U$S(0080) 0001 F448 /OC
EXT(FFFD) 0001 0801 F44E 0000 0000 0000 0EFF 0000 0EFF 0F00 0000 A004 0000 0000 0000 0000 /OC
FROM  0000   TO  044C ALL   0000
EXT(004D) 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 /OC
```

List Any File Manager Files Currently "Offline"

The FOL Directive lists the logical file name and the task's name associated with it for any File Manager file in the system that is currently **offline.** This provides the operator with the necessary information to put the file back **online.** This directive also reports to the operator if there are any volumes in the system waiting to be mounted.

SYNTAX

[/tname]/FOL [?]

[?] (OPTIONAL) Parameter 1, if present, checks the file manager mount service to verify that a mount has been requested.

EXAMPLES

//FOL

Display all file manager files in the system that are **offline.**

/B/FOL ?

Display a message to indicate if the mount service has been requested.

FREEZE

Disable Task Scheduler (Timer Or Interrupt) That Is Connected To A Task

---

The FREEZE Directive inactivates the specified timer or interrupt. An interrupt is disabled. A timer is removed from the timer update queue and its current count value does not change. The FREEZE service affects the timer or interrupt level connected to it and not the attentive task (tname). Parameter 1 is not required, but if it is missing, nothing will happen.

SYNTAX

/tname/FRE[EZE] [timername]
[level]

[timername]
[level] (OPTIONAL) Parameter 1 specifies one of the following:

timername is the name of an allocated timer scheduler.

level is an interrupt level number of an allocated interrupt scheduler.

EXAMPLES

/FREEZE TM

Disable timer TM.

/FRE 7

Disable interrupt level 7.

FRE

Nothing happens.

Give-Up Exclusive-Use Of Device Assigned To My Logical File

The GIVE Directive allows the operator to remove previously imposed exclusive-use conditions from one or more devices. The device(s) must be referenced by the logical file names to which they are assigned.

SYNTAX

[/tname]/GIV[E] logfilname...

logfilname (AT LEAST ONE IS REQUIRED) Parameter 1 must be a logical file name belonging to the current attentive task, or must be a global logical file name.

EXAMPLES

```
//GIVE DO
```

Give up device assigned to DO file.

```
/B/GIVE SO
```

Give up device assigned to B task's logical file SO.

GSR

Display Or Modify Global Shared Region Directory List

The GSR Directive allows the system operator to set or reset the shared region online (SRO) bit in Word GSRPAG of a Global Shared Region Directory List entry, and also to summarize information contained in the Global Shared Region Directory List for one or all entries.

SYNTAX

```
[/tname]/GSR      [ON],[name]
                  [OF[F]]
```

[ON]
[OFF] (OPTIONAL) Parameter 1 specifies ON or OFF.

ON turns SRO bit on for specified entry. All are turned on if second parameter is missing.

OFF turns SRO bit off for specified entry. All are turned off if second parameter is missing.

name (OPTIONAL) Parameter 2 is the actual name of a Global Shared Region for command to modify and/or display.

NOTES:

1. If ON/OFF is not specified, only information for the entry specified is returned. Information is returned for all entries if second parameter is missing.
2. If ON/OFF is not specified, it is necessary to enter the GSR Directive followed by two commas to denote a null entry for the ON/OFF parameter. This permits the use of the names "ON" and "OFF" as Global Shared Region names.
3. Names beginning with + (plus), - (minus), $ (dollar), or # (HEX), as well as names containing commas, cannot be specified as Global Shared Region names with this command.

EXAMPLES

/GSR

Display information for all GSR entries

NAME	START	SIZE	RPV	ECP	APF	APM	SMM	RXM	SRO	RDO	RAL	WAL
CLOGLOB	#01FF	#01	0	0	0	0	0	0	0	0	#0000	#0000
EXGLOB	#03C0	#01	0	0	1	0	0	1	0	0	#0000	#0000

/GSR,,EXGLOB

Display information of GSR entry with name EXGLOB.

```
 NAME    START   SIZE   RPV ECP APF APM SMM RXM SRO RDO    RAL     WAL
EXGLOB   #03C0   #01    0   0   1   0   0   1   0   0    #0000   #0000
```

/GSR ON

Turn SRO on and display information for all GSR entries.

```
 NAME    START   SIZE   RPV ECP APF APM SMM RXM SRO RDO    RAL     WAL
CMGLOB   #01FF   #01    0   0   0   0   0   0   1   0    #0000   #0000
EXGLOB   #03C0   #01    0   0   1   0   0   1   1   0    #0000   #0000
```

/GSR OFF CMGLOB

Turn SRO bit off and display information for GSR entry with name CMGLOB.

```
 NAME    START   SIZE   RPV ECP APF APM SMM RXM SRO RDO    RAL     WAL
CMGLOB   #01FF   #01    0   0   0   0   0   0   0   0    #0000   #0000
```

Refer to the MAX IV Data Structures, System Design Manual for a description of the displayed fields.

```
 NAME   START SIZE RPV ECP APF APM SMM RXM SRO RDO   RAL    WAL
SHGLOB #0711  #05  0   1   0   0   0   0   0   0   #0000 #0000 *BPC
```

The "*BPC" indicates that access to these virtual pages shall bypass the cache. For shared memory systems on a 32/85.

HIS

Print Histogram Stack

The HIS Directive prints the contents of a system histogram stack used to trap pertinent trace information. See the SHADOW Directive for a complete description of this feature. The most recent (youngest) sample is printed first, followed by successively older samples. Each sample can consist of one or two print lines. The longest printed line (if optioned) is the contents of general registers of the sampled program. The shorter line is the PR and PS registers of the sampled program. In this case, the IM, OM, and RB fields of the PS word are broken out for easier analysis. The address on the register sample lines (XXXX) is the address where R1 is stored in the stack.

SYNTAX

[/tname]/HIS[TOGRAM] (while debugging system programs)

EXAMPLE

```
      /HIS
or
      //HIS

REG(XXXX) 1111 2222 3333 4444 5555 6666 .... FFFF #PRPR #PSPS IM OM RB
```

Suspend My Task's Execution If It Is Active And Not Suspended

The HOLD AND H Directives cause the attentive task, if active, to immediately suspend execution. This hold condition can only be cleared by the /RESUME or /RELEASE operator directive. A task cannot be held if its influence level is higher than that of the OC task.

SYNTAX

[/tname]/HOL[D]
[/tname]/H

EXAMPLES

/XYZ/H

/ABC/HOLD

I, INF

Obtain Information About Tasks Currently In CPU Queue

The I and INF Directive displays a heading, followed by a list of all tasks currently in the CPUQ. The task's are typed in order of priority. The format of this report is a series of lines describing all tasks, ordered in descending priority (ascending priority number value) order. This output can be directed to the DO file by specifying //DIS I.

SYNTAX

```
//I
//INF
```

EXAMPLE

```
//I

X      RPS LO C0   IM=0 OM=0 RB=0 TCB=271B IPR=BACE IPS=1019 OV=B
OC     RPX LO C1   IM=0 OM=0 RB=2 TCB=2988 IPR=3823 IPS=1201 OV=D$D
TMP    NPS LO C4   IM=5 OM=5 RB=4 TCB=224F IPR=5F32 IPS=1400 OV=TMP
B      EPI LO C250 IM=1 OM=1 RB=5 TCB=2288 IPR=3823 IPS=1501 OV=JOBCT
FMX    RPS LO C255 IM=0 OM=0 RB=1 TCB=2CA4 IPR=7D3E IPS=1100 OV=
ROL    RPX LO C255 IM=0 OM=0 RB=6 TCB=2EF2 IPR=85FC IPS=1605 OV=ROLTO
IDLE   RPX LO C255 IM=0 OM=0 RB=F TCB=311A IPR=4473 IPS=1FDD OV=
```

Obtain Information About A Specific Task

This I and INF Directive is similar to the previous directive except that a report line is printed only for the attentive task -- if it is currently in the CPUQ.

SYNTAX

```
[/tname]/I
/INF
```

The report is in the form of a single line describing the basic resources and status of the task. The basic format of the line is:

tname rps Linflu Cpri IM=imap OM=omap RB=rb TCB=tcbadd IPR=ipr IPS=ips OV=ove

tname is the name of the task.

r is a single character "residency" code where:

R = permanently resident task
N = transient nonresident (or prescheduled) task
E = established resident task

p is a single character "privilege" code where:

P = privileged (system) task
U = unprivileged (user) task

s is a single character execution status code where:

R = task is rolled-out of memory
Q = task is scheduled in CPU queue, but not active
H = task is active, but in an operator HOLD state
S = task is active, but suspended (WAIT or DELAY service)
I = task is active, but in an I/O wait state
X = task is active, and executing or relinquishing
M = task is active, but awaiting memory allocation

Linflu is the task's influence level and limit priority. It is a number between 0 and 255, where 0 is the highest influence level. Its priority can never rise above this level unless recataloged by the system programmer.

Cpri is the task's execution priority level. It is also a number between 0 and 255, where 0 is the highest priority level. It can be changed by the /CHANGE Directive.

imap is the hardware memory map number between 0 and 7 which the Taskmaster has currently assigned to this task for defining its "instruction" addressing space (=N if none).

omap is the hardware memory map number between 0 and 7 which the Taskmaster has currently assigned to this task for defining its "operand" addressing space (=N if none).

rb is the register block number in the context file currently assigned to the task by the Taskmaster (=N if none).

tcbadd is the virtual address within MAP 0 where the task's prologue TCB starts (Word 0).

ipr is the most recent contents of the PR register when this task was last interrupted by the Taskmaster.

ips is the most recent contents of the PS register when this task was last interrupted by the Taskmaster.

ove is the name of the last loaded or load attempted overlay name.

EXAMPLES

```
/IDLE/I
  or
/IDLE/TYPE I   Either of these commands yield:

IDLE RPX L255 C255 IM=0 OM=0 RB=F TCB=264A IPR=438E IPS=1F00
```

This IDLE task is permanently resident, is privileged, and is currently executing. It has both an influence level and priority level of 255 (the lowest). It is assigned MAP 0 for both its instructions and its operands, and is using register block #F. Its TCB address is a location #264A in MAP 0 addressing space, and when last interrupted by the Taskmaster it was about to execute an instruction at address #438E. It was in MAP 0 and using register block #1 at the time of interruption.

NOTE: In interpreting this report please remember that most of the indicated status can change many times within the time period that a report line indicating status is printed. No attempt to "snapshot" a tasks information report is made by this directive.

Obtain List Of Task Scheduling Interrupts And Their Status

The INT Directive prints the list of system task scheduling interrupt levels and indicates whether each entry is vacant or already connected to a particular task. If the optional **tname** is specified the report includes the interrupts connected to the attentive task **tname.**

SYNTAX

/[tname]/INT[ERRUPTS]

The format for printing both forms of the directive output is as follows:

LEVEL--STATUS-----TASK----FUNCTION

where:

LEVEL is the number in decimal of the task scheduling interrupt.

STATUS: UNCONN- unconnected interrupt level.
CONN - connected to a task but not yet interrupt
THAWED- connected and enabled.

TASK is the name of the task connected to the interrupt level. If blank then the interrupt is unconnected.

FUNCTION SPE - special event function routine.
RES - task will be resumed if active.
ACT - task will be activated if not active already.
KIL - task will be killed if active.

-P - When appended to the right of a function listed above indicates that the interrupt level possesses the periodic nature of a timer, that is, the interrupt level will stay enabled when executed.

ISX

Input Hardware Status From Device Address

The ISX Directive reports the current hardware status for a given device address, the device address associated with a given Transport Control Table (TCT), or for all device addresses (#00-#3F) which return a non-zero status from an input status hardware instruction.

SYNTAX

[/tname]/ISX [TCTname] [deviceaddress]

[TCTname] [deviceaddress] (OPTIONAL) Parameter 1 specifies one of the following:

TCTname is a 3-character CAN-encodable TCT name configured in the system.

deviceaddress is a device address (concatentated group and unit fields) in the range #00-#3F. It can be entered in either hexadecimal or decimal.

EXAMPLE

The format of the report is as follows:

#DA=#hh STATUS=#hhhh

where "hh" and "hhhh" are hexadecimal values.

```
/ISX
DA=#00    STATUS=#7000
DA=#01    STATUS=#1088
DA=#02    STATUS=#118A
DA=#03    STATUS=#8980
DA=#04    STATUS=#1182
DA=#05    STATUS=#C0C8
DA=#07    STATUS=#8480
DA=#09    STATUS=#8080
DA=#0A    STATUS=#8180
DA=#0B    STATUS=#8030
DA=#1C    STATUS=#8080
```

Print Contents Of Attentive Task's Workbench Extension

The KIN Directive displays the attentive task's WORKBENCH TCB extension.

SYNTAX

[/tname]/KIN

EXAMPLE

/KIN

```
KIN(005E) 0000 0000 0000 31D8 0000 C001 F813 AD16 /TER003
KIN(0066) 0000 0000 0000 0000 /TER003
```

LCD (DCS only)

Activates SIO Loader Task And Reloads LIM Monitor And Handlers Onto LIM Card

---

The LCD Directive activates the SIO Loader task and causes a reload of the LIM Monitor and the appropriate handlers onto the LIM card. The LIM PDTs are not reread from the TBL file. Retries are not attempted if an error occurs. The operator must reissue the LCD directive in the event of an error. All of the LIM cards in the DCS system can be reloaded by issuing the LCD directive in the following format:

SYNTAX

```
//LCD #gu,slotnum
```

or

```
//LCD dname
```

or

```
//LCD ALL
```

#gu (REQUIRED) Parameter 1 represents the DCS controller's group and unit number for the card whose memory is displayed.

slotnum (REQUIRED) Parameter 2 represents the slot number of the card whose memory is to be displayed.

or

dname (REQUIRED) Parameter 1 represents the logical device name of a channel on the card whose memory is to be displayed.

or

ALL (REQUIRED) Parameter 1 loads all LIM cards in the system.

NOTE: LCD ALL will not load cards that have previously been marked offline due to a loading error. In such cases, keyword LCD must be used with a specific device name **or** the group/unit number and slot number.

EXAMPLES

```
//LCD 5,#F
```

Load the card for group/unit number 5, slot #F.

```
//LCD A10
```

Load the card associated with the logical device A10.

```
//LCD ALL
```

Load all LIM cards in the system.

Report LDT Contents/Address And Transient LDT Availability

The LDT Directive dumps the contents or address of a Logical Device Table (LDT) or reports on transient disc LDT availability if the "//LDT" form is used.

SYNTAX

[/tname]/LDT [LDTname] [?]
[*lfn]

[LDTname] [*lfn] (OPTIONAL) Parameter 1 specifies one of the following:

LDTname represents the name of the logical device table.

***lfn** represents the LDT which is pointed to by lfn.

[?] (OPTIONAL) Parameter 2 specifies the location of the logical file device.

EXAMPLES

```
//LDT
```

This form of the directive requests the transient LDT report. A sample follows.

```
CURRENT # TRANSIENT LDT'S AVAILABLE 46
```

The contents of a specific LDT is:

```
/LDT BSA
```

This form of the directive dumps the contents of the Logical Device Table for the disc partition BSA. A sample follows.

```
NEG(0AD8) 1286 0AE7 /0C
BSA(0ADA) 0064 0F79 08B6 1801 0000 0000 00FF 0000 /0C
BSA(0AE2) 29E0 0000 01E0 1286 0AF4 0064 0F7A 08B6 /0C
```

```
/LDT BSA ?
```

```
LDT BSA @#0ADA
```

```
/DIS LDT *TY
```

```
/LDT FMF @#0C9E
NEG(0C9C) 0000 0CB4 /0C
FMF(0C9E) 0000 0AC1 0C95 0224 5E38 0000 00FF B02B 0000 0007 C88E 0000 0CC1 900A 9999 9CAB /0C
```

```
/DIS LDT *SI
```

```
/LDT FMF @#1126
NEG(1124) 0A21 C93D /0C
FMF(1126) 0080 FFFE 09F4 0401 0000 0000 00FF 0000 A004 0000 0F00 0A21 C9BC 0000 FFFE 98F4 /0C
```

LENGTH

Set Or Get The Page Length Of A Printing Device

The LENGTH Directive allows the operator to set or vary the page length of any non-spooled print device which is not a MAXNET device. The directive permits page form control of those print devices that are incapable of providing an EOF indication.

A bottom-of-form (BOF) or the condition of present line count greater than or equal to end-of-page length will set EOF in the associated UFT. It is the user task's responsibility to check the EOF status and issue the appropriate form command.

If the devicename and number are not entered, the end-of-page length and present line count of each print device will be listed. This function is designed for use on output (printer) devices or on output communications channels only.

Although the **page length** of printer symbiont devices cannot be changed with this directive, their **page length** values can be printed. The characters "SYM" appear at the end of the report line to indicate a printer symbiont device.

SYNTAX

[/tname]/LEN[GTH][[devicename,[number]]

[devicename] (OPTIONAL) Parameter 1 is the name of the device (printer). The name cannot exceed three characters and must exist in the System Device List.

[number] (OPTIONAL) Parameter 2 is the end-of-page length. If this parameter is omitted, the end-of-page length and present line count for the devicename specified in Parameter 1 is printed.

EXAMPLES

/LEN

This form of the directive requests a report of the end-of-page length and present line count of each print device configured in the system. A sample follows.

```
/LEN LP

TY   #00 #00
LPP  #00 #00
LP   #22 #14 SYM
```

This sample report shows two print devices and one printer symbiont device. The characters "SYM" at the end of the report line indicate a symbiont device.

/LEN LP 55

This form of the directive sets the end-of-page length for devicename LP at 55 lines. In this example, device LP has been SYSGENed (DEVICE statement) with bottom of form simulation support. The new end-of-page length is displayed.

LP #37

Communicate With My Task By Defining Or Setting The Value Of One Of Its Variables

The LET Directive is similar to the RESUME Directive, but it passes a single-word message and optional value to the named task variable extension without affecting its current execution status. If a task variable already exists in the referenced extension with the same name (word), its current value is replaced with the specified value. If the specified word is not found in the task variable extension area, the specified word/value will replace the **unspecified variable** in the task variable extension. If a word is entered for a task and no value is specified, the value is set to #8000. A task's variables cannot be changed if its influence level is higher than that of the OC task.

SYNTAX

[/tname]/LET [word [value]]...

[word] (OPTIONAL) Parameter 1 is the word describing the variable and must be 1- to 3-characters CAN-code.

[value] (OPTIONAL) Parameter 2 is the decimal or hexadecimal value to be given to the variable. If missing, the variable will be given the value #8000.

EXAMPLES

/LET

This directive displays the report of the attentive task's variable extension area. A sample report is shown below.

```
    = -32768
VR1 = 784
VR2 = 4723
VR3 = 367
```

/XYZ/LET

This directive produces a report of the XYZ task's variable extension area.

Display Or Modify The Status/Configuration Of Event Logging

The LOG Directive allows the system operator to display or modify the status or configuration of the MAX IV Event Logging mechanism. Individual options of the command are described below.

SYNTAX

```
[/tname]/LOG  [CYC[LE]          ][CURRENT          ][lfn]
              [ALT[ERNATE]      ][lfn              ][lfn]
              [REP[ORT]         ][tname            ][lmf]
              [POI[NT]          ][[[NO]LOGPOINT... ]
              [RES[UME]         ]
              [SUS[PEND]        ]
              [NOT[IFY]         ]
              [DON['T]NOTIFY]   ]
              [CLE[AR]          ][AFF              ][BFF|RAC]
              [SEQ[UENCE]       ][NUMBER           ]
              [ON                                  ]
              [OFF                                 ]
```

This format of the LOG command allows the operator to obtain the current configuration and status of the Event Logging mechanism. The fields contained in this display and the contents of each field are described below.

FIELD NAME	CONTENT
LOG	Base address of Event Logging data structure block.
CFG	Logging configuration word.
SEQ	Current event sequence number.
UFT	Event Logging file UFT address.
SLF	Event Logging data file logical file name.
ALF	Alternate Event Logging data file logical file name.
LFF	Event Logging format file logical file name.
FPI	File Position Index of Event Logging file currently in use.
CBB	Current input/output buffer base address.
CBA	Current input/output buffer data address.
ABB	Alternate input/output buffer base address.

RTN — Event Logging Report Task name.

RLN — Event Logging Report Task Load Module file name.

RAC — Activation status returned from last REX ACTIVATE of Event Logging Report Task or #8000 if task has not yet been activated.

#NODES CONFIG/AVAIL — The number of logging nodes configured for use by Event Logging and the number of those nodes currently available for use.

STATES: — The current status of Event Logging. Possible values are:

ON - Logging enabled.

OFF - Logging disabled.

ALT - Alternating logging data files.

CYC - Cyclic logging data files.

RES - Resume Event Logging when data file full.

SUS - Suspend Event Logging when data file full.

NOT - Notify operator of Event Logging conditions.

DON - Do not notify operator of Event Logging conditions.

POINTS: — Event Logging points that are enabled. Possible values are:

ACT - Log task activations.

EXI - Log task exits.

ABO - Log task aborts.

INT - Log unsolicited interrupts.

PAR - Log memory parity errors.

BAD - Log memory pages removed from pool of allocatable space.

RAT - Log excessive memory parity error rates.

OFF - Log device offline messages.

RET - Log successful I/O retries.

ITC - Log all ITC errors.

/LOG CYC[LE] [lfn]

The LOG CYC format allows the operator to specify that Event Logging is to log data in the cyclic mode. The operator can also optionally specify the logical file name of the data file to be used by Event Logging.

/LOG ALT[ERNATE] [lfn] [lfn]

The LOG ALT command format allows the operator to specify the alternating data file logging mode. The operator can also optionally specify the logical file names of the two alternating data files. The first lfn specifies the alternate file and the second lfn specifies the current or main file.

/LOG REP[ORT] [tname] [lmf]

The LOG REP command format allows the operator to specify whether or not the Event Logging Report task is to be automatically activated. If the [tname] parameter (task name of Event Logging Report task) is included in the command string, the task will be automatically activated. If not included, no task activation occurs. The command also allows the operator to optionally specify the Event Logging Report Task Load Module file name [lmf].

/LOG POI[NT] [NO]LOGPOINT...] [point-name]

The LOG POI command allows the operator to specify which system events are to be captured and logged by the Event Logging mechanism. The events that are possible are described above in the description of the Event Logging mechanism status directive under the section titled "POINTS". If a particular point is specified in this directive, the Event Logging mechanism will log the event. If a point name is prefixed with the characters "NO", the Event Logging mechanism will not log the event. Multiple point names can be specified on one line and point names can be intermixed with "NO" point names.

/LOG RES[UME]
SUS[PEND]

The LOG RES and LOG SUS command specify if logging is to be resumed or suspended when a logging data file is full.

/LOG NOT[IFY]
DON['TNOTIFY]

The LOG NOT and LOG DON commands allow the operator to specify whether or not Event Logging notification messages are to be displayed to the operator.

/LOG CLE[AR] [AFF][BFF][RAC]

The LOG CLE command allows the operator to clear the full alternate data file [AFF] or both full data files [BFF]. This enables the operator to resume Event Logging without activating the Event Logging Report task. In addition, the Event Logging Report task activation status [RAC] can optionally be cleared.

/LOG SEQ[UENCE] [NUMBER]

The LOG SEQ command allows the operator to optionally set or clear the event sequence number. If the [NUMBER] parameter is not included in the command, the event sequence number is set to zero. If the parameter is included, the event sequence number takes on the value of the parameter (valid values range from 0 through 32767).

/LOG ON
OFF

The LOG ON and LOG OFF Directives allow the operator to specify whether the Event Logging mechanism is to be completely enabled [ON] or disabled [OFF].

EXAMPLE

/LOG

```
LOG@07C7 CFG=#B800  SEQ= 1    STATES: ON   ALT RES NOT NOF
UFT@#06F6 SLF=SLF ALF=ALF LFF=LFF LFM=LFM FPI= 0
CBB=#05F4 CBA=#05FE ABB=#0675 RTN=EVEREP RLN=BM   RAC=#8000
  # NODES CONFIG/AVAIL    10 / 10
   POINTS         INT PAR BAD OFF      RET
FORMAT
```

Print Loader Information Of Attentive Task

The LOX Directive prints the contents of the loader extension region of the attentive task's EXT.

SYNTAX

[/tname]/LOX

EXAMPLE

/LOX

```
*LOADER CONTROL SECTION*
LOX(00D9) 0000 0C3F 0CFF FF00 0E88 0C80 0000 0007 /0C
LOX(00E1) 0000 0C3F 0CFF FF00 0080 0000 0000 00ED /0C
LOX(00E9) 04EA 0000 0000 0000 0000 0000 0000 0000 /0C
LOX(00F1) 0000 0000 0000 0000 0000 0000 F6FA F7FF /0C
LOX(00F9) F8FF F9FF FA9A 0000 0000 0000 F800 /0C
```

LTT

Print A LTT'S Contents Or Address And TCT Address

The LTT Directive prints the contents of a Logical Transport Table (LTT) or, if a question mark is supplied as the second parameter, this directive prints the LTT address and its associated TCT address.

SYNTAX

[/tname]/LTT ltn [?]

ltn	(REQUIRED) Parameter 1 is the Logical Transport Table name.
[?]	(OPTIONAL) Parameter 2 indicates that only the LTT address and the TCT address should be provided.

EXAMPLES

/LTT M0

```
NEG(1269) 0000 8000 0040 0000 0041 0000 0042 0000 /0C
NEG(1271) 0043 0000 0000 0800 0000 0000 0000 0000 /0C
NEG(1279) 0000 0000 0000 0000 4C54 564F 4C32 0000 /0C
NEG(1281) 21C7 0000 0000 1B8D 0000 /0C
M0 (1286) D7C0 0728 0000 5578 0000 0000 0000 0000 /0C
M0 (128E) 0000 08B6 0000 0000 0000 32C0 0000 8000 /0C
```

/LTT M0 ?

```
LTN=M0 @#1286 TNA=PM0 @#08B6
```

Modify Actual Memory Regions And Named Global Common Regions

The MACTUAL Directive will modify actual memory locations without any virtual addressing schemes.

SYNTAX

[/tname] /MAC[TUAL] {pagenumber} {globalname} wordispl[value]...

{pagenumber} {globalname}
: (AT LEAST ONE IS REQUIRED) Parameter 1 can be any actual page number - or the name of a global shared (common) region. In the latter case, the name is replaced by the actual starting page associated with the global region if it is found in the system's directory of such shared memory regions. The modification will be relative to, and confined to, the global region addressing range.

wordispl
: (REQUIRED) Parameter 2 is the word displacement, relative to the selected page above, where the modification will start. Positive displacements (#0000 to #7FFF) address progressively higher memory words relative to the selected page and are used to address individual words in a global common block. Negative displacements (#FFFF to #8000) address progressively lower memory words relative to the selected page. Task bias and subroutine bias will be added to this parameter if a $ precedes it. (Refer to BIAS Directive.)

[value]...
: (OPTIONAL) Parameters 3, 4, 5, ... are one or more values to be stored sequentially in memory starting with the first specified word.

This directive will not modify areas beyond existing memory (that is, no wrap-around occurs at the extremes of memory addresses). Appropriate error messages are displayed for the following conditions:

- An undefined global shared region was specified.
- An address to be modified was out of the global shared region addressing range.
- An address to be modified was beyond existing memory.

Note that modifications will take place for addresses preceding the address which caused the error.

EXAMPLES

```
/MAC #200 254 1,3,5,7,9
```

Modify 5 locations on the boundary of Pages #200 and #201.

```
/MAC BIGCOM 50 #FEEE
```

Modify Word 50 of global region BIGCOM.

Print The Map Image(s) Of Attentive Task

The MAP Directive prints the contents of the attentive task's map image(s). If the task has two map images, the operand map image is typed first.

SYNTAX

[/tname]/MAP[S] [NOS]

[NOS] (OPTIONAL) Parameter 1, when specified as the keyword NOS, indicates that strings of zero value in the map image should not be suppressed.

EXAMPLE

/MAP

```
*MAP IMAGE(S)*
I 0(0000) C123 C124 C125 C126 C127 C128 C129 C12A /0C
I 0(0008) C12B C12C C12D C12E C12F 0000 0000 0000 /0C
FROM   0010 to    00EF    ALL   0000
I 0(00F0) 0000 0000 0000 0000 0000 0000 0000 0000 /0C
I 0(00F8) 0000 0000 0000 0000 0000 0000 0000 0000 /0C
```

/MAP NOS

```
I 0(0000) C123 C124 C125 C126 C127 C128 C129 C12A /0C
I 0(0008) C12B C12C C12D C12E C12F 0000 0000 0000 /0C
I 0(0010) 0000 0000 0000 0000 0000 0000 0000 0000 /0C
I 0(0018) 0000 0000 0000 0000 0000 0000 0000 0000 /0C
I 0(0020) 0000 0000 0000 0000 0000 0000 0000 0000 /0C
I 0(0028) 0000 0000 0000 0000 0000 0000 0000 0000 /0C
I 0(0030) 0000 0000 0000 0000 0000 0000 0000 0000 /0C
I 0(0038) 0000 0000 0000 0000 0000 0000 0000 0000 /0C
I 0(0040) 0000 0000 0000 0000 0000 0000 0000 0000 /0C
I 0(0048) 0000 0000 0000 0000 0000 0000 0000 0000 /0C
I 0(0050) 0000 0000 0000 0000 0000 0000 0000 0000 /0C
I 0(0058) 0000 0000 0000 0000 0000 0000 0000 0000 /0C
I 0(0060) 0000 0000 0000 0000 0000 0000 0000 0000 /0C
I 0(0068) 0000 0000 0000 0000 0000 0000 0000 0000 /0C
I 0(0070) 0000 0000 0000 0000 0000 0000 0000 0000 /0C
I 0(0078) 0000 0000 0000 0000 0000 0000 0000 0000 /0C
I 0(0080) 0000 0000 0000 0000 0000 0000 0000 0000 /0C
I 0(0088) 0000 0000 0000 0000 0000 0000 0000 0000 /0C
I 0(0090) 0000 0000 0000 0000 0000 0000 0000 0000 /0C
I 0(0098) 0000 0000 0000 0000 0000 0000 0000 0000 /0C
```

```
I O(00A0) 0000 0000 0000 0000 0000 0000 0000 0000 /0C
I O(00A8) 0000 0000 0000 0000 0000 0000 0000 0000 /0C
I O(00B0) 0000 0000 0000 0000 0000 0000 0000 0000 /0C
I O(00B8) 0000 0000 0000 0000 0000 0000 0000 0000 /0C
I O(00C0) 0000 0000 0000 0000 0000 0000 0000 0000 /0C
I O(00C8) 0000 0000 0000 0000 0000 0000 0000 0000 /0C
I O(00D0) 0000 0000 0000 0000 0000 0000 0000 0000 /0C
I O(00D8) 0000 0000 0000 0000 0000 0000 0000 0000 /0C
I O(00E0) 0000 0000 0000 0000 0000 0000 0000 0000 /0C
I O(00E8) 0000 0000 0000 0000 0000 0000 0000 0000 /0C
I O(00F0) 0000 0000 0000 0000 0000 0000 0000 0000 /0C
I O(00F8) 0000 0000 0000 0000 0000 0000 0000 0000 /0C
```

Obtain Information About ITC Message

The MES Directive is used to display information about messages queued to one or all ports. The information returned consists of:

- The task name for each port visited
- A list containing the VC number of a message
- A message size in words
- A message type for each message queued to the port

Information about control messages will be listed first in chronological order followed by information about data messages also listed in chronological order. An error return will be made if a port does not exist for the specified task or if the Intertask Communication Service is not in the system.

SYNTAX

/[tname]/MES

EXAMPLES

```
//MES                  -list all outstanding messages
TASKNAME=ABC    SOURCE=3     TYPE=4     LENGTH=310
                SOURCE=3     TYPE=4     LENGTH=50
TASKNAME=XYZ    SOURCE=1     TYPE=5     LENGTH=0

/ABC/MES             -list all outstanding messages for task ABC
TASKNAME=ABC    SOURCE=3     TYPE=4     LENGTH=310
                SOURCE=3     TYPE=4     LENGTH=50
```

Refer to the MAX IV General Operating System, System Guide Manual for further information concerning the MAX IV Intertask Communication Service.

Modify Memory Assigned To A Task's (Or System's) Virtual Addressing Space(s)

The MODIFY, MOP and MIN memory modification directives use the map image tables of the attentive task to modify real memory regions mapped by these tables. The MODIFY and MOPERANDS forms use the operand map (OM) image of the attentive task, while the MIN form uses the instruction map (IM) image. If the task uses only one map image, then all forms will yield identical results. If the map image specifies an allocated page whose Access Rights do not permit modification with the STORE VIA MAP IMAGE (STVM) instruction the location is modified anyway with the STORE ACTUAL MEMORY (STAM) instruction.

SYNTAX

[/tname] /MOD[IFY] staddress [value]...
/MOP[ERANDS]
/MIN[STRUCTIONS]

staddress (REQUIRED) Parameter 1 is the 16-bit starting virtual address where modification begins. Parameter 2 is stored in this word. Task bias and subroutine bias will be added if preceded by a $. (See BIAS Directive.)

[value]... (OPTIONAL) Parameters 2, 3, ... are one or more values to be stored sequentially in memory beginning at **staddress.**

Appropriate error messages are displayed for the following conditions:

- The attentive task has a prologue TCB only.
- An attempt to modify areas beyond the defined map image length or in unallocated pages (Access rights (AR)=00) was made.

Note that modifications will take place for addresses preceding the address which caused the error.

EXAMPLES

/B/MOD #2000 1,2,3,4,5

Place 5 decimal values in the operand spaces of task B, starting at virtual address #2000.

/B/MIN #$3F #FFFF

Modify relative location #3F in instruction addressing space of task B. Use latest bias specification for relocation.

```
//MOD #8107 #E780 #$CF
```

Modify two locations starting at #8107 in MAP 0 addressing space. The second location is relative to the latest BIAS.

Obtain Information

The MPI Directive gives the user task task specified information concerning the attentive task's current status plus additional information such as PSD, register contents, pending I/O nodes and ITC requests. The PSD and register contents are defined by the contents of the task's push stacks, or if empty, by the contents of the PSD and register save areas. Two lines of information are printed with optional data following (I/O node and ITC information) if associated with the task's current state. If the task has no extension, an error message of 'NO EXTENSION' is printed.

SYNTAX

/tname/MPI

EXAMPLE

/BAT001/MPI

```
BAT001   EPI   PR=0163   PS=2728   UOPS=01D0   POPS=0001   OV=SED   XREF=0000   PGS=#1E
REG 39C7 3CCA 0000  40FF 01D0 0087 0000 0089 FF96 2612 3881 2020 0000 0000 0000
REX=0   NODE=DB5A   NODSTA=0200   UFT=3CCA   UFSTA=000B   LFN=CI   DEV=A18   STA=0029
```

Display Map Pool List

The MPL Directive displays the system map pool list containing the task name, TCB address, priority, and map length for each map in the system. If the TCB address is zero, and the task name is AVAIL, then the map is available. If the TCB address is -1, and the task name is MAX IV then the map is dedicated to the system. If the TCB address is -2, and the task name is ALLOC then the map is allocated in a split map 3/4,5,6,7. If map number is specified, only that entry is displayed.

SYNTAX

[/tname]/MPL [Map number]

EXAMPLE

/MPL

MAP	TASK	TCB	PRI	LTH	
0	MAXIV	FFFF	FFFF	0000	MAP 0 is dedicated to the system.
1	AVAIL	0000	0000	00FD	MAP 1 is available, previously owned by task of length 00FD
2	AVAIL	0000	0000	0000	MAP 2 is available
3	ALLOC	FFFE	FFFE	0000	MAP 3 is split into 4 small maps.
4	S	1A87	0003	FFC6	MAP 4 is owned by S
5	TMP	1AF9	0004	FFDA	MAP 5 is owned by TMP
6	RDS	1ACO	000D	FFDB	MAP 6 is owned by RDS
7	MAXIV	FFFF	FFFF	0000	MAP 7 is dedicated to the system.

MSG

Send A Message To A Specified Port

The MSG Directive is used to send messages preceeded by the DATE/TIME STAMP if the DTS option is specified in the SYSGEN, to users on a multi-batch system. The intended receiver is identified in one of two ways, either by the terminal (port) number or by the user's system identification name. If the receiver is specified by name, all terminals onto which that user is logged on will receive the message. MSG uses the PORTINFO REX Service to access the User ID information that is maintained by the MAGIC product.

SYNTAX

[/tname]/MSG port# message

port# (REQUIRED) Parameter 1 is a port number determined by a erminal's position in a Terminal Control List (TCL).

message (REQUIRED) Parameter 2 is an ASCII string message to be sent to the port designated in Parameter 1.

EXAMPLES

/MSG 6 GOOD MORNING

/MSG JANET GOOD MORNING!

Report I/O Node Usage And Availability

The NDP Directive reports the number of I/O nodes configured in the system. This count is broken down into the number of private, global, and resident task (private) I/O nodes. For the private and global nodes the initial number and number currently allocated is reported. For the global I/O nodes the maximum is reported.

SYNTAX

[/tname]/NDP

EXAMPLE

```
I/O NODE POOL CONTROL BLOCK AT #31B1
PRIVATE NODES:
# INITIALLY   20
# CURRENTLY   35
ADDRESS OF FIRST PAGE OF NODES #C900
GLOBAL NODES:
# INITIALLY   16
# MAXIMUM     10 [see note below]
# CURRENTLY   18 [see note below]
ADDRESS OF FIRST PAGE OF NODES #C700
# PRIVATE NODES FOR RESIDENT TASKS    10

/NDP

I/O NODE POOL CONTROL BLOCK AT #23F5
PRIVATE NODES:
# INITIALLY   16
# CURRENTLY   53
ADDRESS OF FIRST PAGE OF NODES #9F00
GLOBAL NODES:
# INITIALLY   10
# MAXIMUM     10 [see note below]
# CURRENTLY   18 [see note below]
ADDRESS OF FIRST PAGE OF NODES #9C00
# PRIVATE NODES FOR RESIDENT TASKS    6
```

NOTE: Global I/O nodes are permanently allocated at start-up. They are returned to the global pool immediately after the I/O operation is completed. When the system is initialized, the number of global nodes allocated is equal to the number of initial global nodes specified in the SYSGEN plus the number of global nodes required by all resident tasks plus the number of nodes that can still fit in the last page used to allocate the global nodes (Example: rounded up to a multiple of the equate NODINP). All of this is done without regard to the maximum number of global nodes specified in the SYSGEN (intended for as-of-not-yet implemented feature of

dynamically allocating global I/O nodes). For this reason, MAXIMUM can be less than CURRENTLY when using the NDP directive.

Print Report Of I/O Usage Of Attentive Task

The NOD Directive prints a report of the I/O operations currently queued by the attentive task.

SYNTAX

[/tname]/NOD[ES]

EXAMPLE

/NOD

```
*I/O NODE LIST*
ADR(FF23) 9F8E /0C
NEG(FF09) 0000 007B 0121 4000 0000 0000 /0C
NOD(FF0F) 0200 0000 0997 0000 A000 09A0 0000 0C1E /0C
NOD(FF17) 151E 099F 0050 FF00 011F 0003 0000 0000 /0C
NOD(FF1F) 8001 0000 0000 0000 /0C
```

NUM, N

Perform Arithmetic Operations On Numbers

The NUM or N Directive accepts for calculation, an expression for left to right evaluation with no operator precedence using 32-bit integers. If a 16-bit quantity is entered with the sign bit set, the sign is extended before calculations are performed. The result is printed out in 8-character hexadecimal, 9-digit decimal, and 6-character CAN-code.

SYNTAX

[/tname]/N[UM] number [,op,number]...

number (REQUIRED) Parameter 1 can be in one of the following forms:

@ 1-to-6 CAN-code characters excluding blanks

[±][$] integer

where integer is up to an 8-character hexadecimal (preceded by #) or decimal string. If $ is selected, the BIAS is set by the /BIAS OC Directive.

[op] (OPTIONAL) Parameter 2 specifies one of the following:

+ which indicates ADDITION
- which indicates SUBTRACTION
* which indicates MULTIPLICATION
/ which indicates DIVISION

The divide operation dumps the hex remainder and quotient. The multiply operation dumps the 64-bit product if 32-bit representation is exceeded, and the result is truncated to 32-bits.

EXAMPLES

```
/NUM #FE*256+5

#0000 FE05          65029    @    ???    "bbbb"
```

EXAMPLE PRINTED:

/NUM xxxx

hhhh hhhh ddddddddd @ccc ccc `aaaa'

Where:

xxxx - item to be converted.

hhhh - 8-character hexadecimal representation.

dddd - 9-character decimal respresentation.

ccc - 6-character CAN representation.

aaaa - 4-character ASCII representation.

If a division is performed:

NUM (FECD) rrrr rrrr qqqq qqqq

Where:

rrrr - remainder

qqqq - quotient

```
/NUM #12345678
#1234  5678        305419896    @B9T   M6P    ' 4Vx'

/NUM #ABCDEF
#00AB  CDEF        11259375     @ DK   5:$    '    '

/NUM @ABCDEF
#0693  19CE        110303694    @ABC   DEF    '    '


/NUM #FE*256+5
#0000  FE05        65029        @      ???    '    '


/NUM #FE00+5
#FFFF  FE05        -507         @???   ???    '    '


/NUM 15/#2
NUM(FECD)  0000  0001  0000   0007   /0C
#0000  0007        7            @             G'    '
```

OCR

Display Resident OC Modules

The OCR Directive displays a list of all OC modules that have been SYSGENed memory resident. If the OC module name is given, determine whether or not that module is memory resident.

SYNTAX

[/tname] /OCR [OC-module-name]

EXAMPLES

/OCR

```
RESIDENT OC MODULES

A     ABO  K    KIL  R
RES   REL  ON   OFF  E
EXE   ACT
```

/OCR A

```
MODULE IS RESIDENT
```

/OCR I

```
MODULE IS NOT RESIDENT
```

Put System Device Into Unavailable "Offline" Condition

The OFF Directive either reports logical files that are assigned to offline devices for all tasks or puts the specified or associated device into an **offline** condition that prevents any further access to the device by any task. If a specified or associated device is put offline, no further requests are queued, and those already queued are placed into a **slough** queue to await the subsequent return of the device to the online condition. Task name will be ignored if a system device is requested rather than a logical file name. "?" can be used as Parameter 1 or Parameter 2. Everything entered after "?" is ignored.

SYNTAX

[/tname]/OFF devicename ?
*lfn
?

devicename
*lfn
?

(AT LEAST ONE IS REQUIRED) Parameter 1 is represented by one of the following:

devicename specifies a device name. It must not exceed three characters and must be valid device names that exist in the System Device List.

***lfn** is the name of a task's logical file preceded by an asterisk.

?

? can be used as Parameter 1 or Parameter 2. Everything entered after "?" is ignored. If ? is specified, logical files in all task's File Assign Tables (FATs) that are assigned to offline devices are listed. If the offline device associated with the logical file is a File Manager Device, the logical filename is preceded by an asterisk, *. Additionally, using ? causes the X-task to log (if event logging configured and reporting of offlines is optioned) and print all offline devices that are either in the System Device List or in the **slough** queue as a result of an offline condition.

EXAMPLES

```
/OFF CR
```

Take card reader down for maintenance.

```
/OFF MT2
```

Take magnetic tape transport offline.

```
/ABC/OFF ?
```

Report logical filenames assigned to offline devices for all tasks in the CPUQ.

ON

Return Device To Useable "Online" Condition

The ON Directive either reports logical files that are assigned to offline devices for all tasks or permits the operator to return disabled **offline** devices or associated devices to the usable state. If a specified or associated device is put online, previously queued operations will be immediately requeued in the device's controller queue, and any previously unsuccessful operation will be retried unless specifically prohibited. Task name will be ignored if a system device is requested rather than a logical file name.

SYNTAX

/ON devicename [NO[RETRY]]
*lfn

devicename
*lfn — (REQUIRED) Parameter 1 specifies one of the following:
devicename is a 3-character name of a device in the System Device List.

***lfn** is a task's logical file name preceded by an asterisk.

If ? is specified, logical files in all task's File Assign Tables (FATs) that are assigned to offline devices are listed. If the offline device associated with the logical file is a File Manager Device, the logical filename is preceded by an asterisk, *. Additionally, using ? causes the X-task to log (if event logging configured and reporting of offlines is optioned) and print all offline devices that are either in the System Device List or in the **slough** queue as a result of an offline condition.

[NO[RETRY] — (OPTIONAL) Parameter 2, if specified, causes a previously unsuccessful operation to not be retried, and for the program which queued this operation to be **fooled** into believing that the previously attempted data transfer (if any) was successful.

EXAMPLES

```
/ON CR
```

Return CR to useable state.

```
/ON MT2
```

Make MT2 available for use.

/ABC/ON ?

Report logical filenames assigned to offline devices for all tasks in the CPUQ.

OPTIONS, POPTIONS

Set Or Get My Attentive Task's Options

The OPTIONS and POPTIONS Directives are used to set the individual bits of a task's System Option Word or Program Option Word. These option words exist for every task in the prologue TCB if the task is currently in the CPUQ. The bits can be used as pseudo-sense-switches which are unique to the task. The System Option Word contains bits which are examined by various system functions and are manipulated with the OPTION Directive. The Program Option Word contains bits which are never examined by the system and are thus usable freely by the program. These bits are manipulated with the POPTION Directive.

The bits in each word have names that are used to identify them. The hexadecimal bit number is normally used as its name although Bits 7 through F of the System Option Word have alternate names (LO, BO, ...) which are commonly interpretable if the task is a batch-processing task. Bits E and F of the System Option Word have names (HL and DU) suitable for any task. Any number of bit names can be specified to be set (or reset) by each invocation of the directive. Unspecified names will not have their corresponding bits changed. If the name of a bit is preceded by the characters NO, the bit will be reset (=0); otherwise, the bit will be set (=1).

A task's options cannot be modified by this directive if the task's influence level is higher than that of the OC task.

SYNTAX

```
[/tname]/OPT[IONS]      [[NO]0          ]
[/tname]/POP[TIONS]     [[NO]1          ]
                        [[NO]2          ]
                        [[NO]3          ]
                        [[NO]4          ]
                        [[NO]5          ]
                        [[NO]6          ]
                        [[NO]7          ]  or [[NO]LO    ]
                        [[NO]8          ] [[NO]BO        ]
                        [[NO]9          ] [[NO]SC[RATCH]]
                        [[NO]A          ] [[NO]HO[LD]    ]
                        [[NO]B          ] [[NO]MA[P]     ]
                        [[NO]C          ] [[NO]GO        ]
                        [[NO]D          ] [[NO]AO        ]
                        [[NO]E          ] [[NO]HL[OAD]   ]
                        [[NO]F          ] [[NO]DU[MP]    ]
```

GET CURRENT OPTIONS

Variant Forms

/tname/OPT[IONS]
or
/tname/POP[TIONS]

These forms of the directives, with no parameters specified, cause the contents of the appropriate option word to be printed in hexadecimal format, followed by the bit names which are set (=1).

EXAMPLES

/OPT

Print current system options of current attentive task. Sample output follows:

```
#01D0
THE FOLLOWING BITS ARE SET:
  7/LO  8/BO  9/SC  B/MA
```

/B/OPT

Print current system options of batch task B.

/B/OPT DUMP

Cause hexadecimal dump of the operand addressing space of task B should it be subsequently aborted (sets Bit F or DU).

/B/OPT NODU

Do not perform hexadecimal dump of task B when it next aborts. (Reset Bit F or DU.)

/TESX/OPTION 1 3 5 NO2 NO4

Set Bits 1, 3, and 5 and reset Bits 2 and 4 of system option word of task TESX.

/ABC/POP F NOE

Set Bit #F and reset Bit #E of task ABC's program options.

/POP

Print current program option of current attentive task.

/OPT #01D0

The following bits are set: 7/LO, 8/BO, 9/SC, and B/MA

Install One-Shot Pause In My Attentive Task

The PAUSE Directive can be used by the operator to debug system application programs. It will install, remove, or specify options of a single **one-shot** pause, which is a REX service call which replaces any instruction in the application program. The original instruction will be saved in a temporary area of memory for later reinstallation in the program after the pause REX service has executed. When the program enters the area of the program where the REX service has been installed, it will print a message of the form:

PAUSE IN /tname/oname

on the device assigned to the global (or local) logical file CO (Computer to Operator). Optionally the service will also type the contents of the task's PS word and all general registers (R1-R15), and it can also place the task in a **hold** state. The original instruction replaces the pause REX and the program is prepared to return to that point to execute the original instruction upon exit from the REX service.

This directive should not be used to install a pause in a reentrant REX service or in an interrupt routine. A pause can only be installed in application programs and in system processors which are **static** at the time of execution of the directive (for example, resident or established and unrolled). A nonresident overlay program can use the (Hold-on-Load) option, so that a pause can be installed.

If a pause is successfully installed, the following message is typed following the directive:

PAUSE REPLACES iiii @ aaaa IN /tname/oname

iiii	is the hexadecimal representation of the original instruction that was replaced
aaaa	is the virtual address in the affected task's instruction addressing space (IM)
tname	is the name of the task, and
oname	is its most recent overlay program name.

This message will also be repeated if other forms of the PAUSE Directive are entered subsequent to the installation of a pause as long as a pause remains installed.

The attentive task name (optionally prefixed to the directive) determines which addressing space is used to install the pause at its specified virtual address. This address is always installed in the attentive task's instruction map (IM) space. If the attentive task is resident in MAP 0, then MAP 0 addressing space is used.

SYNTAX

```
[/tname]/PAU[SE]    [[#]address     ]
                    [RE[GISTERS]    ]
                    [NORE[GISTERS]  ]
                    [HO[LD]         ]
                    [NOHO[LD]       ]
                    [OF[F]          ]
```

Only one pause at a time can be installed in a system using this directive. If a second pause is specified, while another is already installed, the previous pause will be removed automatically. If an installed pause is never encountered by the executing program, it can be removed manually by typing the form:

```
/PAUSE OFF
```

The REG/NOREG or HOLD/NOHOLD options can be specified on the same call line which installs the pause -- or can be specified separately at any time without affecting the installation of a pause. The original pause installation message will be repeated, however, to remind the user that a pause is already installed.

If the REGISTER dump is requested, it appears on two lines in the format of the HEX DUMP service (REX,#3F) and appears just prior to the PAUSE message on the same device (CO file). The registers are dumped directly from the task's push stack, which is located in MAP 0; thus the address on each dump line should be ignored. The first dumped quantity is the contents of the task's Program Status (PS) register. This is followed by the contents of registers 1-15. They represent the conditions of the task just prior to its executing the instruction replaced by the pause. These conditions will be restored after the pause.

When extensive debug features are needed, such as multiple traces and pauses, the system processor DEBUG can be used rather than this simple operator directive. This interpretive debug package operates in a batch-processing environment and loads the program being debugged as an overlay of DEBUG.

The SYSBUG statement in System Generation must have been included in the system if this directive is to be used with a non-zero histogram stack size.

EXAMPLES

Assume a program called GEORGE cataloged on file BM has been executed as an overlay of a batch-processing task B and has entered the HOLD state as specified by the Hold on Load (HL) option:

```
$EXECUTE GEORGE,BM,HL       Load GEORGE from BM file.
LOADER HOLDING.../B /GEORGE  GEORGE is now loaded.
```

Assume that it is desired to know what is contained in the program's registers at relative address #3F within one of the program's subroutines. This subroutine starts at address #602F in the program according to its link editor map. When the program holds, depress the Console Interrupt switch to start the Operator Communication task; then type:

```
/B/BIAS #602F+TASK   Set subroutine and task bias.
#602F #1000          Here they are.
```

This statement establishes the virtual offset address of the program so that relative addresses can be entered when the PAUSE is installed. The second number indicates that the program was biased at #1000 in the TASK addressing space when cataloged and when loaded. The pause can now be entered in terms of a virtual address which is relative to the program's subroutine listing:

```
/B/PAUSE $#3F REG HOLD     Install pause, set options.
PAUSE REPLACES #XXXX AT #YYYY IN/B /GEORGE
            Check XXXX to be sure.
```

The report line indicates the instruction removed (XXXX) by installation of the pause at absolute address YYYY. The program can now be resumed and, if it executes the subroutine where the pause is installed, the requested items will be printed. The register report starts with the task's Program Status Word followed by registers 1-7 on the first line and registers 8-15 on the second line. The address (AAAA) in parentheses can be ignored but is in the task's push stack.

```
/B/RESUME                  Clear loader hold.
PAU(AAAA) PSPS R1R1 R2R2 R3R3 R4R4 R5R5 R6R6 R7R7 /B /
PAU(BBBB) R8R8 R9R9 RARA RBRB RCRC RDRD RERE RFRF /B /
PAUSE IN /B/GEORGE <HOLD
Enter pause hold.
```

Before resuming GEORGE, another pause can be installed, or GEORGE can be permitted to continue execution normally:

```
/B/RESUME          Clear pause hold.
```

Enter Or Exit Pipeline Mode

The PIP Directive causes the attentive task's pipeline mode control bit in it's TCB to be set or reset. If ON or OFF is not specified, the current state is returned.

SYNTAX

[/tname]/PIP[ELINE] [ON]
[OF[F]]

EXAMPLE

/B/PIP ON

Permit last loaded overlay of attentive task to use the CLASSIC 78xy's full pipeline capabilities.

Print Only Prologue TCB Of Attentive Task

The PRO Directive prints only the Prologue section of the attentive task's TCB. This section is the main root section of the much larger TCB and contains pointers to other sections of the TCB in a fixed indexable order. The first section (NEG) is negatively indexed, and the second section is positively indexed.

SYNTAX

[/tname]/PRO[LOGUE]

EXAMPLE

/PRO

```
N 7(1517) 0000 8000 0000 0000 FFEF F300 1557 /0C
P 0(151E) 2800 138F 212C 7FFF 9F00 5B48 F6B2 F69C /0C
P 0(1526) 4068 0000 0000 756D 0000 7771 1B01 C4EA /0C
P16(152E) C11F C120 C121 C122 0000 0000 0000 1536 /0C
P16(1536) 0000 0000 0000 151E 0000 0000 0000 8000 /0C
P32(153E) 8000 FF00 011F FF00 011F F700 F700 0C80 /0C
P32(1546) 0000 0E88 01D0 0000 0000 0000 0000 0000 /0C
P48(154E) 0015 0015 0000 /0C
```

Obtain Information About ITC Ports

The PRT Directive prints out information for one or all ports in the port list. The information returned is:

- The task name
- The load module file
- The activation priority for the port's task
- The options
- The maximum number of VCs permitted
- The type of port
- The current number of open VCs for each port

An error message will be printed if the specified task has no associated port structure. An error return will be made if the Intertask Communication Service is not in the system.

SYNTAX

[/tname]/PRT

EXAMPLES

```
//PRT                    -type information for all ports
TASK      LMF     PRI      MAXVCS      CURVCS      TYP      OPTIONS

ABC       LM      250         8           1        SVR      ACT
XYZ       BM      255       250          87        SVR      ACT SAB SEX
MNO       LM      200        16           0        SVR
B         LM      255         4           0        USR

/ABC/PRT               -list port information for task ABC
TASK      LMF     PRI      MAXVCS      CURVCS      TYP      OPTIONS

ABC       LM      250         8           1        SVR      ACT

/ZZZ/PRT               -list port information for task ZZZ
NO PORT DESCRIPTOR EXISTS FOR TASK NAME SPECIFIED
```

NOTE: The information returned under TYP and OPTIONS has the following meanings.

UNDER TYP:

SVR	PORT IS A SERVER PORT
USR	PORT IS A TEMPORARY USER PORT

UNDER OPTIONS:

ACT	ACTIVATE PORTS TASK ON MESSAGE ARRIVAL
SAB	SAVE VCs ON TASK ABORT
SEX	SAVE VCs ON TASK EXIT

Refer to the MAX IV General Operating System, System Guide Manual for further information concerning the MAX IV Intertask Communication Service.

Display Or Modify Current Power Status And History

The PWR Directive is used to indicate the current power status and power history of a MODCOMP CLASSIC Series Computer. This directive can also be used to reset the power history bits so that future power events will not go unnoticed.

SYNTAX

[/tname]/PWR [OF[F]]

[OF[F]] (OPTIONAL) Parameter 1 will reset the AC-lowline and power failure history bits.

EXAMPLES

```
/PWR                        - what is current power status
CURRENT STATUS:  AC UP  DC UP  SMM DOWN OR NOT CONFIGURED

/PWR                        - what is current power status
AC-LOWLINE HAS OCCURRED
CURRENT STATUS:  AC UP  DC UP  SMM UP

/PWR OFF                    - display status and reset history bits
AC-LOWLINE HAS OCCURRED
CURRENT STATUS:  AC UP  DC UP  SMM UP
```

NOTE: Power history is displayed before resetting. This provides the ability to display the history and reset it in one step.

QUEUE

Report Map Zero Work Queues

The QUE Directive reports the MAP 0 work queue control table and queued work nodes. It first dumps the queue control table with the dump identifier equal to the queue name, that is, **XCT** for the Exceptional Condition Task's work queue and **FMX** for the File Manager Exceptional Condition Task's work queue. Next it dumps the elements queued. The dump identifier is **ELE**, indicating work element node. Since the work element node configuration is **independent** of the work queue linkage design a fixed number of words to the left (negative) and to the right (positive) of the element node's links are dumped.

SYNTAX

[/tname]/QUE[UE] [name]

[name] (OPTIONAL) Parameter 1 is the 3-character or less CAN-codeable work queue name. (Default = all work queues will be reported.)

EXAMPLES

/QUE

This form of the directive requests all work queues be reported on the CO file. A sample report is shown below.

```
XCT(2AB4) 2D3F 968C 5031 503C 000D 2AB9 2AB9 0000 0000 311A /0C
FMX(2D3A) 0000 27A0 7D7B 7D84 000F 2D3F 2D3F 0000 0000 311A /0C
```

/QUE XCT

This form of the directive requests a display of the XCT work queue on the CO file.

```
XCT(2AB4) 2D3F 968C 5031 503C 000D 2AB9 2AB9 0000 0000 311A /0C
```

Display Register Block List

The RBL Directive displays the system register block list containing the task name, TCB address, priority, and exclusive use of each register block in the system. If the TCB address is zero, and the task name is AVAIL then this is an available register block. If a register block number is specified, only that entry is displayed.

SYNTAX

/RBL [Register block number]

EXAMPLE

/RBL

RB	TASK	TCB	PRI	USE	
0	X	2AA5	0000		RB 0 owned by X
1	FMX	302E	00FF		RB 1 owned by FMX
2	AVAIL	0000	0000		RB 2 available
3	OC	2D12	0001		RB 3 owned by OC
4	S	1A87	0003		RB 4 owned by S
5	TMP	1AF9	0004		RB 5 owned by TMP
6	B	1B32	00FA		RB 6 owned by B
7	RDS	1AC0	00FD		RB 7 owned by RDS
8	ROL	327E	0005		RB 8 owned by ROL
9	TEST	1CDA	00F0	EXCL	RB 9 owned by TEST, task has exclusive use
A	AVAIL	0000	0000		RB A available
B	AVAIL	0000	0000		RB B available

RECONNECT

Reschedule My Task To Be Activated, Resumed, Or Killed When Timer Expires

---

The RECONNECT Directive modifies the parameters of an existing timer scheduler but does not allocate a timer scheduler.

SYNTAX

```
[/tname]/REC[ONNECT] {timername} [[ACT]IVATE]]
                                 [[RES[UME]]
                                 [[KIL[L]]

                                 [PRI[ORITY] level ]
                                 [FIL[E] filename  ]
                                 [I  [[time of day]]
                                 [IE [[elapstime]  ]
                                 [P  [[time of day]]
                                 [PE [[elapstime]  ]
```

{timername} (AT LEAST ONE IS REQUIRED) Parameter 1 is a three-character name beginning with "T" which is the name of a valid system timer to be reenabled. The /CONNECT Directive will print the name of the allocated timer for use with this reenable directive.

(OPTIONAL) Parameters 2,3,4,5,6 can come in any order. They are not position dependent.

[ACT[IVATE]
[RES[UME]
[KIL[L] Specifies one of these three keywords that selects the action to be performed on the attentive task. The ACTIVATE action is defaulted when none of of these keywords appears in the directive.

[PRI[ORITY] level] Specifies a priority that the attentive task will use as an execution priority if the ACTIVATE action is used, and if the task's priority was not already bound at cataloging time. The default is either 255 or the value cataloged with the task.

FIL[E] filname] Specifies a logical file name to be used to load the cataloged task. If the ACTIVATE action is used, the default is the file "LM".

[I time of day]
[IE elapstime] Specifies one of the following: I time of day specifies that the initial expiration of the timer will be at a specified time-of-day after the timer is enabled (THAWED).

IE elapstime specifies that the initial expiration of the time will be a specified elapsed time after the timer is enabled (THAWED). An elapsed time of zero ticks is used when neither the "IE" nor the "I" parameter string is included.

[P time of day]
[PE elapstime] Specifies one of the following:

P time of day parameter string specifies that the timer is periodic and also specified the time period in time-of-day format. After an initial timer expiration (specified with I or IE), the period will become 24 hours but phased at the specified time-of-day.

PE elapstime parameter string specifies that the timer is periodic and specifies the period in elapsed time format. After an initial timer expiration (specified with I or IE), the period will become the specified value.

NOTE: [[[hr]min]tick]] is the format of any time value entry used with the I, IE, P, and PE keyword strings above. If the value is less than a minute, only ticks need be specified. If less than an hour, only minutes and ticks need be specified.

EXAMPLE

```
/REC TM IE 200 PE 800
```

Reconnect timer "TM" and pass new arguments.

REG

Print The Registers Of Attentive Task

The REG Directive prints the most recent contents of the general registers (REG) of the attentive task. If the task no longer has a register block, a printout of the register-save area (RSV) of the TCB will be printed.

SYNTAX

[/tname]/REG[ISTERS]

EXAMPLE

/REG

```
RB (914B) 09A0 F676 0000 F675 879D 0000 0C1E 0000 /OC
RB (9153) 4400 0C1E 0000 099F F90E 0000 775B /OC
```

Resume My Task's Execution If It Is Currently Active And Suspended

The RESUME, RELEASE and R Directives cause the attentive task to resume execution if it is already active and in a suspended (or HOLD) state. An optional word and value can be passed to the task (refer to the LET Directive). The R or RESUME Directive additionally causes the OC task to stop accepting further directives. If the word and value are not entered, the task variable values in the TCB are not changed. The task cannot be resumed if its influence level is higher than that of the OC task.

SYNTAX

```
[/tname]/R                [word  [value]]
[/tname]/RES[UME]
[/tname]/REL[EASE]
```

[word] (OPTIONAL) Parameter 1 is the word describing the variable and must be 1- to 3- CAN-code characters.

[value] (OPTIONAL) Parameter 2 is the decimal or hexadecimal value to be given to the variable. If missing, the variable will be given the value #8000.

EXAMPLE

```
/B/R

/XYZ/RESUME MAP=500
```

Reenable Task Scheduler (Timer Or Interrupt) And Change Its Characteristics

The RETHAW Directive reenables a single timer or interrupt and specifies new parameters for the scheduler. The system expects a task to be connected to the addressed timer or interrupt. For timers, a new set of times is set in the timer queue (THAWED). The attentive task has no meaning to this directive. A one-shot timer or interrupt that does not unconnect can be made periodic by this directive.

SYNTAX

```
/RET[HAW]  {timername}  [I   [[time of day]...
           {level}      [IE  [[elapstime   ]
                        [P   [[time of day]
                        [PE  [[elapstime   ]
                        [PER[IODIC]        ]
```

{timername}
{level}

(AT LEAST ONE IS REQUIRED) Parameter 1 specifies one of the following:

timername is a 3-character name beginning with "T" which is the name of a valid system timer to be reenabled. The /CONNECT Directive will print the name of the allocated timer for use with this reenable directive.

level is an integer interrupt level to be enabled. The number of the level must be a valid level or pseudo level that was designated as a task scheduler at system generation time.

[I time of day]
[IE elasptime]
[P time of day]
[PE elasptime]

(OPTIONAL) Parameter 2 specifies one of the following:

I time of day specifies that the initial expiration of the timer will be at a specified time-of-day after the timer is enabled (THAWED).

IE elapstime specifies that the initial expiration of the timer will be a specified elapsed time after the timer is enabled (THAWED). An elapsed time of zero ticks is used when neither the "IE" nor the "I" parameter string is included.

P time of day parameter string specifies that the timer is periodic and also specifies the time period in time-of-day format. After an initial timer expiration (specified with I or IE), the period will become 24 hours but phased at the specific time-of-day.

PE **elapstime** parameter string specifies that the timer is periodic and specifies the period in elapsed time format. After an initial timer expiration (specified with I or IE), the period will become the specified value.

NOTE: [[[hr]min]tick] is the format of any time value entry used with the I, IE, P, and PE keyword strings above. If the value is less than a minute, only ticks need be specified. If less than an hour, only minutes and ticks need be specified.

[PER[IODIC]] (OPTIONAL) Presence of this parameter 2 for an interrupt will make a one-shot interrupt periodic.

EXAMPLES

```
/RET TM IE 200 PE 800
```

Reenable timer "TM" and pass new arguments.

```
/RETHAW 7
```

Reenable interrupt level.

REWIND, HOME

Initialize Or Position Device Assigned To My Logical File To Beginning-Of-Medium

The REWIND and HOME Directives permit the operator to initialize devices for use by the attentive task and to position such devices to the physical or logical beginning-of-medium position. The device(s) must be referred to by the assigned logical file name.

SYNTAX

[/tname]/REW[IND] [logfilename]...
[/tname]/HOM[E]

[logfilename] (OPTIONAL) Parameter 1 must be a logical file name which belongs to the current attentive task, or must be a global logical file name.

EXAMPLES

```
//REWIND CO DO
```

Rewind operators terminal and printer.

```
/B/REW LO
```

Rewind listing output file of task B.

Roll A Task Out Of Or Into Main Memory

The ROLL Directive will roll the attentive task into or out of main memory. It can also change the rollability of the task and alter the suspend state of the task prior to the roll in/out. If after entering this directive the message "NO ACTION NEEDED" is output then your request does not require any action on the part of the ROLLER task.

SYNTAX

[/tname]/ROL[L] {IN } [LOC[K]] [NOS[USPEND]]
{OUT} [UNL[OCK]] [SUS[PEND]]

{IN}
{OUT} (AT LEAST ONE IS REQUIRED) Parameter 1 specifies the keyword that determines the roll direction.

[LOC[K]]
[UNL[OCK]] (OPTIONAL) Parameter 2 determines whether or not the task's rollability is to be changed. If the keyword LOCK is specified, then the task will be marked unrollable. If the keyword UNLOCK is specified, then the task will be marked rollable.

[NOS[USPEND]]
[SUS[PEND]] (OPTIONAL) Parameter 3 specifies whether or not the task's suspend state is to be altered prior to the roll in/out.

EXAMPLES

```
/ROL OUT UNL
```

Make attentive task rollable and request it to be rolled out.

```
/ABC/ROL IN LOC
```

Roll task ABC in and make it unrollable.

SEARCH

Search A Task's Virtual Space

The SEARCH Directive searches the attentive task's instruction or operand virtual memory from a beginning address or zero through an ending address or #FFFF for a specified value or zero. It can optionally AND mask all values searched before making comparisons.

The SEARCH Directive normally searches the Operand map. This capability can be overridden by specifing "IM" or "OM" as a parameter. All parameters for this directive are optional, but numerical parameters must be specified before alphabetical ones. When entering numerical parameters, the last one specified will always be considered to be the comparand, except when "startaddress-endaddress" are the only numerical parameters.

These directives will relinquish to lower priority tasks after testing a word in virtual memory whose address specifies an even multiple of 1K (1024) words.

SYNTAX

[/tname]/SEA[RCH] [start] [-end] [numwords] [comparand] [MA[SK]=mask] [IM] [OM]

[start] (OPTIONAL) Parameter 1 is the 16-bit starting virtual address where the search will begin in the selected addressing space. Default value for this parameter is 0.

[-end] [numwords] (OPTIONAL) Parameter 2 is the 16-bit ending virtual address where the search is to stop in the selected map or the number of words to search through from the beginning address. Default ending address is #FFFF.

[comparand] (OPTIONAL) Parameter 3 is the 16-bit value to be searched for in the specified adressing space. If not specified all of memory scrolls up the screen.

[MA[SK]=mask] (OPTIONAL) Parameter 4 is the 16-bit mask value to be used in searching the addressing space for the comparand. This specified value is to be 'AND'ed with each word to be searched and compared to the comparand for matching values. The default mask value is #FFFF, which means all bits of each word are to be compared.

[IM] [OM] (OPTIONAL) Parameter 5 selects the addressing space to be searched as either the Instruction Map or the Operand Map. This parameter overrides the maps defaulted to by the type of directive (TYP, DIS, TIN, DIN, TOP, DOP).

EXAMPLES

```
/S/DIS SEA #200-#600 #A500 MA=#FF00 OM
```

Search the S tasks operand virtual memory from location #200 through #600 for the AND masked value #A500 and print the results on the global DO file.

```
/GH/TYP SEA 5 IM
```

Search the Instruction Map of task GH from locations #0000 to #FFFF for the value #0005 and print the results on the global CO file.

```
/KH/DIS SEA #30 #2332 IM
```

Search the Instruction Map of task KH from locations #0030 to #FFFF for the value #2332 and print the results on the global DO file.

```
/HH/DIS SEA 0 64 #E700 MA=#FF00 IM
```

Search the Instruction Map of task HH from locations #0000 to #003F for values of the form #E7xy, where x and y can be any value. Print the results on the global DO file.

```
/GK/SEA 0-#5F #90
```

Search the Operand Map of task GK from locations #0000 to #005F for the values #0090 and report them on the global CO file.

Enable/Disable System Tracing Functions (The Shadow)

The SHADOW Directive, in various forms, controls the functions of the system debugging tool called the **shadow**. The shadow is an optional interrupt routine operating at interrupt level 3. This routine is capable of **sampling** system status at any desired rate -- even up to the **choke point** of the system. As it samples system status, the routine stores the PS, PR, and (optionally) the general registers of the program it interrupts, in a special "circular" histogram stack in memory. Interrupt level 3 is normally used for inter-CPU communications but can be taken over by the shadow. This interrupt level must be connected to an external pulse generator. A pulse generator capable of uniform narrow pulses (approximately 0.5 microseconds in width) and a variable repetition rate from 10 microseconds to 500 microseconds will be suitable if it has a TTL-compatible output. A coaxial connector on the rear panel of the CLASSIC 78XY will accept the output of the pulse generator.

The pulse repetition rate of the pulse generator must be set according to the function being performed by the shadow. If only PS and PR are being sampled, a shorter period is required than if registers are also being sampled. Generally, the period between pulses is adjusted by setting the generator so that the entire system is choked and then increasing the period until the overhead is reduced to permit the system to run adequately. Choking can generally be verified by displaying the contents of location #1F (in MAP 0) via the dynamic memory display (refer to VIEW Directive) on the front panel (TRACE/#EE/CTX). This location is updated by the IDLE task if it is active. If this cell is changing, it indicates that the system is receiving enough CPU time to process all tasks. The rate at which this word is changing can be controlled by the pulse generator. The "choke" point is reached when this cell stops incrementing. Backing off the repetition rate slightly until the cell increments slowly will then yield a setting suitable for "catching" failures. Because of the overhead, the shadow should not be used when critical real-time processes cannot be disturbed -- since it will slow down the effective instruction execution rate of the computer. The shadow is generally used only when the system programmer needs to analyze the cause of software/hardware failures and needs a histogram preserved in memory which describes the system environment just prior to a failure. With such information, a system programmer can analyze the "past history" leading up to the failure.

The SYSBUG statement in System Generation must have been included in the system if this directive is to be used. This statement determines the size of the histogram stack.

SYNTAX

[/tname]/SHA[DOW] ON
OF[F]
HO[LD]
RE[GISTERS]
NO[REGISTERS]

SPECIFIC FORMS OF THE DIRECTIVE

/SHA[DOW] ON

The above directive will disconnect any user-supplied level 3 subroutines (U$XCPU) and will enable the **shadow** instead. Level 3 will be enabled (should it not be already enabled). The shadow's histogram stack will be cleared to zero just prior to enabling the interrupt so that previous history sampling information will be cleared.

/SHA[DOW] OF[F]

The above directive will disable the shadow sampling function, reenable any user-supplied level 3 routines (U$XCPU), and leave level 3 enabled if already enabled. The frozen contents of the histogram stack can be examined at this time.

/SHA[DOW] HO[LD]

The above directive will disable level 3 unconditionally. The frozen contents of the histogram stack can be examined at this time.

/SHA[DOW] RE[GISTERS]

The above directive will select an optional feature of the shadow which permits it to sample the general registers it interrupts if (or when) it is turned ON. If not specified, only PS and PR are sampled by the shadow when it is on.

/SHA[DOW] NO[REG]

The above directive will specify that no registers are to be sampled and that only the PS and PR are to be sampled by the shadow when it is on.

COMBINATIONS OF THE DIRECTIVE

The various shadow functions can be specified together, on a common call line, and are performed in the order they are specified.

EXAMPLES

```
/SHADOW REG ON
```

Turn on shadow, and make it save registers as well as PR/PS status.

```
/SHAD OFF
```

Turn off shadow resume normal usage of level 3, then permit operator to TYPE or DISPLAY contents of histogram stack. (Refer to HISTOGRAM Directive.)

Print Report Of Page-Sharing Usage Of Attentive Task

The SHR Directive prints a report of any entries currently in the attentive task's page-sharing extension of its TCB.

SYNTAX

[/tname]/SHR

EXAMPLE

/SHR

```
*PAGE SHARING EXTENSION*
PSI(0011) 0000 0000 0000 0000 0000 0000 1000 0000 /OC
PSI(0019) 0000 0000 0000 0000 0000 0000 1000 0000 /OC
PSI(0021) 0000 0000 0000 0000 0000 0000 1000 0000 /OC
PSI(0029) 0000 0000 0000 0000 0000 0000 1000 0000 /OC
```

Report Map Zero Transient Page Availability

The SPL Directive produces a report of MAP 0 transient pages. It reports the total number of pages in the system, the page number range, and the current number of pages available.

SYNTAX

[/tname]/SPL

EXAMPLES

```
//SPL

TOTAL TRANSIENT MAP ZERO PAGES EVER    23
PAGE NUMBERS RANGE #E7-#FD
NUMBER PAGES CURRENTLY AVAILABLE       23
```

Print Contents of Attentive Task's System Page List Extension

This directive prints the contents of the attentive task's transient MAP 0 system page list extension if any exists.

[/tname]/SPL [NOS]

```
/B/SPL

*SYSTEM PAGE LIST EXTENSION FOR B       *
SPL(0000) 000F 0000 0000 0000 0000 0000 0000 0000 /OC
SPL(0008) 0000 0000 0000 0000 0000 0000 0000 0000 /OC

//SPL

TOTAL TRANSIENT MAP ZERO PAGES EVER    90
PAGE NUMBERS RANGE #9C-#F5
NUMBER PAGES CURRENTLY AVAILABLE       81
```

Display Shared Region Directory Information

The SRG Directive allows the system operator to summarize information in the shared region directories. The directive displays global shared region directory entries, private shared region directory entries, and shared load module directory entries.

SYNTAX

/SRG

NOTES:

1. The LMF entry is left vacant for both global and private shared regions.

2. Private shared region vacant entries and shared load module vacant entries are tallied. The Global shared region directory does not support vacant entries.

EXAMPLE

```
/SRG
 NAME     ADDR   TYPE   RLOK   WLOK   START   SIZE   STATUS   LMF
EXTMEM  #0557   GLOB                  #07E0   #01    #04FF
SMALL   #055F   GLOB                  #07DE   #02    #00FE
RAPRIV  #0569   PRIV   R$R    R$W    #0000   #01    #00FF
    25 VACANT PRIV ENTRIES
SEDIT:  #063A   SLMO                  #0000   #32    #05CE   BM
JSED:   #0643   SLMO                  #0E31   #38    #05C8   TM
    23 VACANT SLMO ENTRIES
```

STK

Print The Stacks Of Attentive Task

The STK Directive prints the contents of the push stacks of the attentive task. The main stack pointer table, followed by the contents of its stack, are printed first. This is followed by the stack pointer table and stack area of the smaller PS/PR stack, used to save nested REX service links. If the main stack is extensible, only the currently active part will be printed.

SYNTAX

[/tname]/STK

EXAMPLE

/STK

```
*MAIN STACK TABLE AND STACK*
TBL(00C6) F600 F675 F696 0016 0000 0000 0000 0000 /0C
FROM   0000 to    005F    ALL   0000
STK(0060) 0000 0000 0000 0000 0000 0000 0000 0000 /0C
STK(0068) 0000 0000 0000 0000 0E88 9C00 A9F2 0000 /0C
STK(0070) 1991 8800 FFFF A931 FFFF 0000 0000 1428 /0C
STK(0078) A000 0004 0000 F97B 0000 0000 099F 0058 /0C
STK(0080) 0000 0005 007B 4121 0C1E 151E 75EA 151E /0C
STK(0088) 0C1E 0000 8103 07DE 09A0 0024 002C 8103 /0C
STK(0090) 0024 F7FF 002C 0000 01D0 0000 /0C

*PS/PR STACK TABLE AND STACK*
TBL(00CE) F900 F90E F910 001A 0000 /0C
STK(0000) 0000 0000 0000 0000 0000 0000 0000 0000 /0C
STK(0008) 0000 0000 0000 0000 1B08 3031 5B48 0045 /0C
```

Obtain ITC Server Names And Related Task Names

The SVR Directive is used to print out a list of ITC server names along with their associated task names for one or all tasks on the system. An error message will be printed if a task specified has no server name and ITC is in the system. An error return (up arrow) will be made if ITC is not in the system.

SYNTAX

[/tname]/SVR

EXAMPLES

```
//SVR                          -list all server names.
TASK        SERVER

ABC         TASK_ABC_SERVER_NAME_NUMBER_1
XYZ         TASK_2
MNO         TASK_3
ABC         TASK_ABC_SERVER_NAME_NUMBER_2
DEF         TASK_4

/XYZ/SVR                       -list all server names for task XYZ
TASK        SERVER

XYZ         TASK-2

/ABC/SVR                       -list all server names for task ABC
TASK        SERVER

ABC         TASK_ABC_SERVER_NAME_NUMBER_1
ABC         TASK_ABC_SERVER_NAME_NUMBER_2

/B/SVR                         -list all server names for task B

NO SERVER NAME EXISTS FOR TASK NAME SPECIFIED
```

Refer to the chapter on Intertask Communication Service in the MAX IV General Operating System, System Guide Manual for further information.

TAKE

Take Exclusive-Use Of Device Assigned To My Logical File

The TAKE Directive permits the operator to make one or more devices come under the exclusive control of a particular task. Such control remains in effect until specifically removed by the operator (refer to /GIVE). The operator must refer to the devices by the names of the logical file(s) to which the device(s) are assigned.

SYNTAX

[/tname]/TAK[E] [logfilnam]...

[logfilnam] (OPTIONAL) Parameter 1 must be the name of a logical file of the attentive task or of the system's Global File Assign Table.

EXAMPLES

```
//TAKE DO
```

Take exclusive use of device assigned to DO file.

```
/B/TAKE SO
```

Take exclusive use of the device assigned to B task's SO file.

Print Logical File Assignments Of Attentive Task

The TAS Directive prints the contents of the logical file assignment list of the attentive task. If the attentive task is "/X/" or "//," then the global file list of the system can be printed. If one or more logical file names (lfn) are specified only the assignment status of those specified logical files will be printed.

NOTE: Using the directive "ASS" requires the directive DIS or TYP to be specified.

SYNTAX

```
[/tname]/{TAS} [lfn[lfn]...]

[/tname]/{TYP} ASS [lfn[lfn]...]
         {DIS}
```

EXAMPLES

```
    /TAS BI BO
or
    /DIS ASS BI BO

FILE-CDEV--FP-INDEX---DDEV---CUR-FILE-TO-FILE----DEF-FILE-TO-FILE
 BO    BSA         0       BSA
 BI    BSA         0       BSA

    //TAS
or
    //DIS ASS

FILE-CDEV--FP-INDEX---DDEV---CUR-FILE-TO-FILE----DEF-FILE-TO-FILE
 CO    TYO         5       TYO
 OC    TYO         0       TYO
 QM    QM          0       QM
 ITC   ITT         0       ITT
 TY    TYO         0       TYO
 RO    QRD         0       QRO
 CR    CRP         0       CRP
 CRS   CRP         0       CRP
 JC:   CR          0       CR
 DO    LPA        13       LPA
 LO    LPP         0       LPP
 LM    QLM         0       QLM
 JM    QLM         0       QLM    LM=                  LM=
 SM    QSM       145       QSM
 USM   ITT         3       ITT
 BM    QBM      1785       QBM
 TPD   TPO         1       TPO
 RAD   NO          0       NO
VACANTS BIO/FMG=     8/1
```

TBP

Report TCB System Usage And Availability

The TBP Directive reports the number of Task Control Blocks (TCB's) configured in the system. It then reports this count broken down into the number of currently available TCB's, the number of TCB's in use by transient tasks, and the number in use by resident tasks.

SYNTAX

[/tname]/TBP

EXAMPLE

/TBP

```
TOTAL # OF TCBS IN SYSTEM = 17
# TCBS NOT CURRENTLY IN USE = 8
# TCBS IN USE BY RESIDENT TASKS = 7
# TCBS IN USE BY TRANSIENT TASKS = 2
```

Print Entire TCB Of Attentive Task

The TCB Directive prints the contents of the TCB (Task Control Block) of the attentive task. The report uses the hexadecimal dump format to print out the various sections of TCB -- starting with the Prologue section. Each list, queue, stack, et cetera, is broken into its individual entries and elements. Each section can be printed separately if the proper keyword is used as well as in this conglomerate report. A complete analysis of these reports will be possible if the user refers to the MAX IV Data Structures System Design Manual.

SYNTAX

[/tname]/TCB

TCL

Display Terminal Control List

The TCL Directive prints information from the terminal control list if one is configured. If a terminal control list does not exist the directive generates * on the CO file.

SYNTAX

[/tname]/TCL

EXAMPLE

```
/TCL
 UCBTCL=#2F15  #TERMINALS IN LIST = 22
 TCL ADDR    STATUS    INPUT          OUTPUT         MONITOR        QUEUE
  #13D3      #6001     A00 @#111C     A00 @#111C     TMP @#3050     #0001
  #13E2      #6002     A02 @#1132     A02 @#1132     TMP @#3050     #0001
  #13F1      #6003     A04 @#1148     A04 @#1148     TMP @#3050     #0001
  #1400      #6004     A06 @#115E     A06 @#115E     TMP @#3050     #0001
  #140F      #6005     A08 @#1174     A08 @#1174     TMP @#3050     #0001
  #141E      #6006     A10 @#118A     A10 @#118A     TMP @#3050     #0001
  #142D      #6007     A12 @#11A0     A12 @#11A0     TMP @#3050     #0001
  #143C      #6008     A14 @#11B6     A14 @#11B6     TMP @#3050     #0001
  #144B      #6009     A16 @#11CC     A16 @#11CC     TMP @#3050     #0001
  #145A      #600A     A18 @#11E2     A18 @#11E2     TMP @#3050     #0001
  #1469      #600B     A20 @#11F8     A20 @#12F8     TMP @#3050     #0001
  #1478      #600C     A22 @#120E     A22 @#120E     TMP @#3050     #0001
  #1487      #600D     A24 @#1224     A24 @#1224     TMP @#3050     #0001
  #1496      #600E     A26 @#123A     A26 @#123A     TMP @#3050     #0001
  #14A5      #600F     A28 @#1250     A28 @#1250     TMP @#3050     #0001
  #14B4      #6010     A30 @#1266     A30 @#1266     TMP @#3050     #0001
  #14C3      #6011     A32 @#127C     A32 @#127C     TMP @#3050     #0001
  #14D2      #6012     A34 @#1292     A34 @#1292     TMP @#3050     #0001
  #14E1      #6013     A36 @#12A8     A36 @#12A8     TMP @#3050     #0001
  #14F0      #6014     A38 @#12BE     A38 @#12BE     TMP @#3050     #0001
  #14FF      #6015     A40 @#12D4     A40 @#12D4     TMP @#3050     #0001
  #140E      #6016     A42 @#12EA     A42 @#12EA     TMP @#3050     #0001
```

Print A TCT'S Contents Or Address And PDT Address

The TCT Directive prints the contents of a Transport Control Table (TCT) or if a question mark is supplied as the second parameter, this directive prints the TCT address and its associated PDT address.

SYNTAX

[/tname]/TCT tna [?]

tna	Parameter 1 is the physical Transport Control Table's name.
[?]	Parameter 2 can be specified as the character "?". This indicates that only the TCT address and the PDT address should be provided.

EXAMPLES

/TCT PM0

```
NEG(0899) 0000 0000 0000 0000 0000 0000 0000 0000 /0 C
NEG(08A1) 0000 0000 0000 0000 0000 0000 0000 0000 /0 C
NEG(08A9) 0000 0000 0000 0000 0000 0000 0000 0000 /0 C
NEG(08B1) 0000 0000 0000 0000 08E3 /0 C
PM0(08B6) D780 0000 08B6 0728 0001 6623 0000 0000 /0 C
PM0(08BE) 0064 0020 0002 00CB 0000 0000 0000 1286 /0 C
```

/TCT PM0 ?

```
TNA=PM0 @#08B6 PDT@=0728
```

Terminate Device Operations Already Queued To Device Assigned To My Logical File

The TERMINATE Directive causes all currently queued operations to the device assigned to the specified logical file to be terminated abnormally. The specified file must belong to the current attentive task or the global logical file.

SYNTAX

[/tname]/TER[MINATE] [logfilename]...

[logfilename] (OPTIONAL) Parameter 1 is a logical file name. More than one can be specified on the directive line.

EXAMPLES

```
//TERMINATE CO
```

Terminate queued operations to the operator's terminal.

```
/B/TERMINATE LO
```

Terminate listing output device of task B.

Enable Task Scheduler (Timer Or Interrupt) Already Connected To A Task

The THAW Directive enables one or more task schedulers (timers or interrupts) which must have already been allocated and connected (see /CONNECT) to some task. The attentive task has no meaning to this directive. Timers and interrupts can be specified on the same directive. The specified name(s) or interrupt level number(s) can be preceded with a negative sign (-) which alters the characteristics of the scheduler but has meaning only if the scheduler is periodic (one-shot). Normally, a non-periodic scheduler will be automatically disabled and deallocated (unconnected) after it performs its one (and only) action (for example, timer will expire; interrupt will be requested). The presence of the negative sign causes the scheduler to remain connected to its task, although it will be disabled after the first action occurs.

In the latter case, the scheduler need only be RETHAWED (refer to /RETHAW) to make it perform its function again, although new values must be specified for timer schedulers. In the former case, the schedulers must be reallocated (connected) and enabled (thawed) again if it is to reperform its action.

SYNTAX

[/tname]/THA[W] {[-]timername}...
{[-]level}

{[-]timername}
{[-]level} (REQUIRED) Parameter 1 specifies one of the following:

timername is a 3-character name beginning with "T" which is the name of a valid system timer to be enabled. The /CONNECT Directive prints the name of the allocated timer for use with this enable directive.

level is an integer interrupt level number to be enabled. The number of the level must be a valid level or pseudo-level that was designated as a task-scheduler at system generation time.

EXAMPLES

```
/THAW TMA TMB
```

Enable "TMA" and "TMB."

```
/THAW TMA
```

Enable "TMA" (one-shot timer) and have timer remain connected after initial time expires.

```
/THAW 7,#8
```

Enable two interrupt levels.

```
/THAW TMQ #A
```

Enable timer and interrupt level #A.

Set Or Get The Time-Of-Day

The TIM Directive can be used to get the current DATE/TIME maintained by the system's Time-of-Day clock, or to set the TIME portion of the DATE/TIME STAMP. The Time-of-Day clock is a 24-hour clock with a maximum value of 23 hours, 59 minutes, and 59 seconds. The resolution of the clock is better than seconds. It is in ticks. A tick is a SYSGEN dependent unit of time that can be as small as .005 seconds or any multiple thereof. The /TIM directive can set the time only to the closest second.

The time (as well as the date) should always be set whenever the system is started or restarted. At midnight (00,00,00), the following message is displayed on the system operator's terminal:

GOOD MORNING!

SYNTAX

[/tname]/TIM[E] [hours] [minutes] [seconds]

When no parameters are entered, the current date/time is printed on the line following the directive.

[hours] (OPTIONAL) Parameter 1 can range from 00 to 23 and sets the hours value.

[minutes] (OPTIONAL) Parameter 2 can range from 00 to 59 and sets the minutes value.

[seconds] (OPTIONAL) Parameter 3 can range from 00 to 59 and sets the seconds value.

EXAMPLES

```
/TIM 12
```

Set system time to noon.

```
/TIM 12,00
```

Set system time to noon.

```
/TIM 12,00,00
```

Set system time to noon.

```
/TIM 15/30
```

Set system time to 3:30 PM.

```
/TIME 0
```

Set system time to midnight.

```
/TIM 3  30  00
```

Set system time to 3:30 AM.

```
/TIM
```

Display the system time on the line following this directive.

```
/DIS TIM
```

Display the system time on file DO.

```
12 JUN 84  03:30:02
```

Obtain Memory Configuration And Availability

The TME and MEM Directives produce a report of the current memory configuration and of its current availability. It also loads the /ECM overlay.

SYNTAX

[/tname]/TME
[/tname]/MEM

EXAMPLES

/TME

Display the system's current memory configuration and availability on the CO file.

/DIS TME

Print the system's current memory configuration and availability on the DO file.

The directive produces a report as follows:

```
HI PAGE IN PRIVATE MEMORY      =#03FF  =  1023
HI PAGE IN SHARED MEMORY       =#03DF  =  991
MAX PAGES EVER ALLOCATABLE     =#0306  =  774
MAX PRIVATE SHARING PAGES      =#7FFF  =  32767
CURRENT PAGES ALLOCATABLE      =#02BA  =  698
BAD PAGE COUNT                 =#0001  =  1
```

Obtain List Of Task Scheduling Timers And Their Status

The TMR Directive provides information about system task scheduling timers. The list output indicates whether each entry is vacant or already connected to a particular task. If the optional **tname** is specified the report only includes those timers connected to the attentive task **tname.**

STATUS:

L - LOCAL
O - ONE SHOT
P - PERIODIC
U - UNCONNECT IF EXPIRED

SYNTAX

[/tname]/TMR [timerkey]

[timerkey] (OPTIONAL) Parameter 1 identifies a specific timer. When Parameter 1 is specified only the status of that particular timer is printed.

Print TOCLOCK List Contents

The TOL Directive prints the contents of the TOCLOCK linked list data structure.

SYNTAX

[/tname]/TOL

EXAMPLE

/TOL

```
TOL (057A) 0580 0000 0000 0000 0000 0000 0000 0000/OC
TOL (0580) 0586 0000 0000 0000 0000 0000 0000 0000/OC
TOL (0586) 058C 0000 0000 0000 0000 0000 0000 0000/OC
TOL (058C) 0000 0000 0000 0000 0000 0000 0000 0000/OC
```

TRA

Obtain Status Or Change Responsibility For A Logical/Physical Transport

---

The TRA Directive is used to transfer responsibility for a logical or physical transport between File Manager and the Basic IO System. The name of a volume to be mounted on a logical transport under File Manager or the transient partition mapping of a logical transport under BIOS can optionally be specified. The current status of a logical or physical transport can be printed using this directive.

SYNTAX

[/tname]/TRA tna [FMG] [volumename] [IM[MEDIATELY]]
[BIO] [mapname] [PT]
[?]

tna (REQUIRED) Parameter 1 is the transport name.

[?]
[FMG]
[BIO] (OPTIONAL) Parameter 2 identifies the requested responsibility for the logical or physical transport.

? (or default) specifies the current status of the logical or physical transport is reported.

FMG causes the logical transport specified as Parameter 1 to be put under File Manager responsibility.

BIO causes the logical transport specified as Parameter 1 to be put under Basic I/O System reponsibility.

[volumename]
[mapname] (OPTIONAL) Parameter 3 is one of the following:

volumename indicates the file manager volume to be mounted.

mapname indicates the transient partition definitions to be loaded.

[IM[MEDIATELY]]
[PT] (OPTIONAL) Parameter 4 is one of the following:

IM indicates the responsibility transfer is requested even if users are currently using the logical transport. The IM Parameter should only be used when it is known that the users of the logical transport will not be performing I/O on their files after the transfer of responsibility. If I/O is performed, a User Assign Error (UAS) will be returned.

PT specifies Parameter 1 is used as a physical disc transport name.

If NVM is set for this physical transport, then volume recognition on the physical transport level is initiated. This recognition includes each of the logical transports defined on the physical transport. If NVM is reset, information is returned for each logical transport defined on the physical transport.

The status report will have some three-character state flags to the right of the first line of the report. Their meanings are as follows:

NVM	No volume logically mounted.
ETS	BIOS expects the logical transport to be logically mounted.
DTS	File Manager expects the logical transport to be logically mounted.
MRI	A mount request has been issued to this logical transport.
DRI	A dismount request has been issued to this logical transport.
MTB	Magnetic-tape unit is busy rewinding.
APR	I/O node held back due to magnetic tape rewinding.

EXAMPLES

```
/TRA M1 BIOS
```

This directive form requests BIOS responsibility for Transport M1. In this example the following report is displayed.

```
#0005:   DISMOUNT VOLUME FROM TRANSPORT
#0005:   TRANSPORT = DM3
```

```
/TRA M0
```

This directive form requests the current status of transport M0. In this example, the following report is displayed.

```
#0001:   ASS TO BIOS ETS
#0001:   TASKS USING VOL:
             B
             S
             X
```

The report indicates the transport M0 is assigned to BIOS and tasks, B, S and X are using the volume.

TYPE, DISPLAY

Type/Display A System (Or Task) Information Report

The TYPE and DISPLAY Directives cause the output of an OC Directive to go to the global CO file. This is the default. The DISPLAY OC Directive causes the output of an OC Directive to go to the global DO file. This can be used with any OC Directive to obtain a printed copy of the output.

SYNTAX

```
[/tname]/TYP[E]      [OC Directive Name]
[/tname]/DIS[PLAY]
```

EXAMPLES

```
/TYP   DAT
```

Has the same result as typing /DAT.

```
/DIS   DAT
```

Displays /DAT Directive output to the DO file.

Display Memory Assigned To Task's (Or System's) Virtual Addressing Space(s)

This series of memory display directives use the map image tables of the attentive task to display or type memory regions mapped by these tables. The TYPE, TOPERANDS, DISPLAY, and DOPERANDS forms use the Operand Map (OM) image of the attentive task, while the TINSTRUCTIONS and DINSTRUCTIONS use the Instruction Map (IM) image. If the attentive task uses only one map image then all forms will yield identical results. If the addressing space of the attentive task is not currently stable, it can be necessary to ESTABLISH it or HOLD it.

The TYPE, TOPERANDS, and TINSTRUCTIONS Directives output their memory reports on the CO file. The DISPLAY, DOPERANDS, and DINSTRUCTIONS Directives output their memory reports on the DO file.

SYNTAX

[/tname]/TYP[E]	staddress	[numwords]	[DE[CIMAL]]
[/tname]/TOP[ERANDS]		[-endaddress]	[NO[SUPPR]
[/tname]/TIN[STRUCTIONS]			[AS[CIICAN]
[/tname]/DIS[PLAY]			[HE[ADER]
[/tname]/DOP[ERANDS]			
[/tname]/DIN[STRUCTIONS]			

staddress (REQUIRED) Parameter 1 is the 16-bit starting virtual address where the display will begin in the selected addressing space. If a $ precedes this parameter, the task and subroutine bias are added to the entered value (refer to BIAS Directive.)

[numwords] [-endaddress] (OPTIONAL) Parameter 2 is either the total number of words to be displayed or if preceded by a negative sign, the last virtual address to be displayed. If $ precedes ("-$endaddress"), then the task and subroutine bias is added (refer to BIAS Directive).

[DE[CIMAL]] [NO[SUPPR]] [AS[CIICAN]] [HE[ADER]] (OPTIONAL) Parameter 3 is one of the following:

DE causes the displayed words to be printed in decimal rather than hexadecimal format. This keyword can appear anywhere after the **staddress** parameter.

NO causes the resulting dump to not suppress any repeated-value lines. This keyword can appear anywhere after the **staddress** parameter.

AS causes a report to be appended to the right of the output with the ASCII and CAN-code equivalents for the hexadecimal values.

HE causes the time and date to be printed on the top of the report.

Appropriate error messages are displayed for the following conditions:

- The attentive task has a prologue TCB only.
- The attentive task left the system (CPUQ) while its memory was being displayed.
- The attentive task is rolled out.
- A region of the specified display fell into regions beyond the defined map image length or into pages which are unallocated.

EXAMPLES

```
/B/DIN 0-#FFFF
```

Dump the entire contents of the batch-processing task B's instruction addressing space in hexadecimal format to the DO file.

```
/B/DISPLAY 12
```

Print the contents of cell 12 (decimal) of task B's operands on the DO file.

```
//TYPE #20 #FF
/OC/TYPE #20 255
/X/TYP 32 #FF
```

The three examples above each list on the CO file #FF words starting at relative location #20 in MAP 0 addressing space.

```
/B/TYP $#EF 5 DECIMAL
```

Type 5 cells in decimal, starting at relative location #EF on the CO file.

Disable And Deallocate Task Scheduler (Timer Or Interrupt)

The UNCONNECT Directive disables and deallocates the task scheduler. The specified timer or interrupt is directed to FREEZE and then to deallocate so that it is available for use by others. The attentive task (tname) is meaningless since the directive affects the timer or level and whatever task was connected to it.

SYNTAX

/UNC[ONNECT] {timername}
{level }

{timename}
{level} (AT LEAST ONE IS REQUIRED) Parameter 1 specifies one of the following:

timename is the name of an allocated timer scheduler.

level is an interrupt level number of an allocated interrupt scheduler.

EXAMPLES

```
/UNCONNECT TMA
```

Disable and deallocate timer.

```
/UNC 7
```

Disable and deallocate interrupt level 7.

VAR

Define, Set, Or Delete The Name And Variable Of My Task

The VAR Directive is similar to the LET Directive, but it allows the additional capability to delete variables from the extension or define a new one. If a task variable - whether it is the **unspecified variable** or not - already exists in the extension with the same name, its current value will be modified to the new one. If the specified variable is not found in the extension area, the variable and value will be added to the extension, if there is room. In order to delete all variables in the extension, the first parameter must be the four-letter keyword DELE. If only one variable is to be deleted, DELE must be the second parameter. The unspecified variable cannot be deleted.

SYNTAX

[/tname]/VAR [word][value]
[DELE][DELE]

[word]
[DELE] (OPTIONAL) Parameter 1 is the keyword describing the variable and can be 1- to 3-characters CAN-code.

When Parameter 1 is specified as the keyword "DELE" all entries in the extension are deleted.

[value]
[DELE] (OPTIONAL) Parameter 2 is the decimal or hexadecimal value to be given to the variable. If blank, the variable will be given the value #8000. When Parameter 2 is specified as the keyword "DELE" the variable specified by the first parameter is deleted from the extension.

EXAMPLE

/VAR

This directive produces a report of the attentive task variable extension area. A sample report follows.

```
     = -32768
VR1  = 784
VR2  = 4723
VR3  = 367
```

Print Attentive Task's Variables And Their Values

The VEX Directive prints the contents of the attentive task's variables extension list if any exist.

SYNTAX

[/tname]/VEX

EXAMPLE

/VEX

```
*VARIABLE CONTROL SECTION*
VEX(0033) 0000 8000 0000 0000 0000 0000 0000 0000 0000 /OC
```

Select Addressing Space Of Dynamic Memory Viewer

The VIE, VOP, and VIN Directives affect the dynamic memory display that operates in conjunction with the main control panel of the CLASSIC while the MAX IV Operating System is in use. By selecting any 16-bit address in the main panel control switches (sense switches), the contents of any memory cell can be viewed in **real time.** When the system is initially loaded and started, the MAP 0 virtual addressing space (system nucleus) is selected for viewing; any 16-bit virtual address in this space can be selected with the control switches.

Since a 16-bit address is not sufficient to display all memory cells, this Directive permits several large functional memory regions to be observed alternately. This display is called the **memory viewer.**

The viewer samples the selected memory cell at the rate of the real-time clock and presents it for viewing in a dedicated register and register block of the context file. At this rate (200 Hz), there is no visible flicker and a clear display can be depended upon regardless of the application program loading. If the value being displayed is blurred then it is changing its value at a rate too fast for the eye to discern. The following switches must be selected before the memory viewer is usable:

RB = #E replace with = '1110
REG = #E replace with = '1110

CLASSIC 786X	
MBC	= '0
IOP	= '0
MBC	= '0
CTXT	= '1

These directives provide the following features:

- View the system nucleus (MAP 0)
- View a task's instruction space
- View a task's operand space
- View actual memory
- View a named global region

The syntax for each command format is described in the following paragraphs.

SYNTAX

```
[/tname] /VIE[W]                [pagenumber]
         /VOP[ERANDS]           [globalname]
         /VIN[STRUCTIONS]
```

System Nucleus (MAP 0) Viewing

//VIE[W] -- select the MAP 0 virtual addressing space for viewing.

Task Virtual Space Viewing

If the addressing space of another task is to be viewed, and that addressing space is **stable,** then the following directive will select the virtual addressing space of the attentive task **tname.** /VIN displays the task's instruction space while the other directives use the task's operand space.

/tname/VIE[W]	Select the virtual addressing space of the attentive task 'tname' for viewing.
/tname/VOP[ERANDS]	Select the task's operand space for viewing.
/tname/VIN[STRUCTION]	Select the task's instruction space for viewing.

Actual Memory Viewing

If actual memory regions are to be viewed, the control switches select a word displacement relative to the specified page number. This displacement can be positive (0 to +32767) or negative (-1 to -32767).

/VIE[W] pagenumber Select actual memory regions to be viewed.

Named Global-Shared-Region Viewing

Any SYSGEN defined global (common) region can be viewed. The control switch value is a word displacement (subscript) used to address the individual words of any global region up to 32,768 words long (0 through #7FFF).

/VIE[W] globalname	Select the global common region (specified by name) for viewing.

Illegal Viewing

If a virtual view function is selected, and the specified virtual address in the control switches is within regions of the associated map image that have no pages allocated (Access Rights (AR) =00), then the display will **blink** the value #FF00 followed by the value #00FF at a perceptible rate to indicate the illegal display. Virtual addresses beyond the range of a short map image display unpredictable results.

If an actual view function is selected, and the specified displacement in the control switches is not within valid actual memory regions, then zeros (#0000) are usually displayed. If the actual memory regions being viewed are global common blocks, any displacements out of the range of the block displays unpredictable results.

EXAMPLES

```
//VIE[W]
```

In MAP 0 addressing space, with the control switches set to the indicated values the following information is displayed:

Control Switches	Viewed Information
#0003	The page number being used by the memory viewer for control switch address translation. If bit 0=0 this is a page containing a map image used for virtual address translation. If bit 0=1, this is an actual page number to which the displacement is relative (for example, start page of a global common block).
#0004	A relative IDLE time bar graph. This will graphically display the relative amount of time that would be **soaked-up** by IDLE task. If it appears as all ones (#FFFF), then essentially all time is being given to the IDLE task. If it is zero (#0000), no time is being granted to the IDLE task and all the CPU time is used up by other real tasks and system overhead. For any condition in between these extremes the graph will be left shifted 1-15 bit positions. The data used to generate this displayed time utilization graph is sampled every clock period -- and integrated over 16 clock periods to form this **instantaneous** display.
#0006	The highest actual page number in this CPU's private memory -- as determined by the system start-up memory diagnostic.
#0007	The highest actual page number in CPU-shared memory or the highest page number in private memory if no memory is shared.
#0008	The maximum (negative) number of pages ever allocatable in the dynamic memory pool.
#0009	The current (negative) number of pages available in the dynamic memory pool.
#0010	The TCB address of the currently active task.
#0011	The TCB address of the highest priority task in the CPUQ.
#0012	The TCB address of the lowest priority task in the CPUQ (always the IDLE task).

#001F	Current page number being probed by memory diagnostic loop executed by the IDLE task. The rate at which this count is incrementing is indicative of idle time. The page number should never become larger than the highest private memory page (word #0006).
#0020 through #00FF	Various hardware dedicated locations for interrupts, DMP's and so on.
#0100 through #01FF	MAP 0's map image table.
#0410, #0411	The 32-bit total elapsed system run time.
#0412, #0413	The 32-bit total time utilized by tasks other than the IDLE task. This time includes system overhead.
#0414, #0415	The 32-bit sample of total utilized time, sampled every 16 clock periods. The difference between successive samples is used to generate the bar graph in word #0004.
#0417	The address of the end of the map zero resident nucleus.

The MAX IV Data Structure, System Design Manual can be referenced for additional interesting and useful locations that can be viewed while the system is running.

/B/VIEW	View the addressing space of the batch-processing task B.

WAC

Reports Who Has Area Control Of A File

The WAC Directive scans through the volume users list and checks each task to determine which task has area control of the specified file. The task names and logical file name that the file is currently open under is returned. If the file is open under "OUS CB" concurrent READ and WRITE, then all the tasks using the file are listed. The name of the task that wants to know who has area control of a specific file precedes the WAC Directive.

SYNTAX

/tname/WAC logfilename tna

logfilename (REQUIRED) Parameter 1 represents the logical file name that the file was attempted to be open under.

tna (REQUIRED) Parameter 2 represents the logical transport that the file resides on.

EXAMPLE

```
/BAT016/WAC AA L00
```

Display the name of the task that has area control of this file and the logical filename it is open under.

```
TASK = BAT001 HAS FILE OPEN UNDER LFN = XYZ
```

Control Memory Cell "WATCH" Feature Of The Shadow

The WATCH Directive causes the **shadow** to **watch** a memory cell in addition to its normal status histogram sampling function. It is particularly useful during debugging of suspicious privileged programs which can occasionally **destroy** some privileged memory cell, and the only clue is that **somebody** destroyed or otherwise altered its contents. The shadow can be programmed to **watch** the cell in the **stable** virtual addressing space of any task or in any actual page. If any unusual activity is observed in the cell, the MAX IV system can be shutdown (HALT) or the shadow placed in HOLD state with evidence in the shadow's histogram stack for analysis.

SYNTAX

```
/WAT[CH]    [viraddress          ]
            [page/wordisp        ]
            [globalname/wordisp]
            [ON                  ]
            [OF[F]               ]
            [EQ[UAL] value       ]
            [NO[TEQ] value       ]
            [AN[D] value         ]
            [HA[LT]              ]
            [X                   ]
```

/WAT[CH] ON

The above directive will start the watching function, if the SHADOW itself has already been turned ON -- or whenever it is turned ON.

/WAT[CH] OFF

The above directive will cause the shadow to cease the watching function but will not affect other shadow sampling functions.

WATCH ACTUAL MEMORY AREA

```
/WAT[CH]    page/wordisp
            globalname/wordisp
```

The directive above causes the shadow to watch the 16-bit memory cell whose actual address is the specified word displacement relative to the specified actual page. Both the SHADOW and WATCH functions must be ON before the watching will begin. The hexadecimal (or decimal) page number is separated from the decimal (or hexadecimal) word displacement by a slash(/) character. If a global shared region name is used in place of **page**, the actual page of that region will be determined and used by the WATCH.

WATCH VIRTUAL ADDRESSING SPACE

/[tname]/WAT[CH] viraddress

The directive above causes the shadow to watch the 16-bit memory cell whose specified virtual address is in the operand space of the specified attentive task **tname.** The SHADOW and WATCH functions must be ON.

SPECIFY CRITICAL VALUE OF WATCHED CELL

/WAT[CH] {EQ[UAL]} value
{NO[TEQ]}

The directive above selects the critical value that the **watched** memory cell should be (or should not be) in order to halt the system or to HOLD the shadow. If the failure being sought destroys a cell which is normally fixed in value, then the NOTEQ function should select the fixed value. If a constantly changing cell is being destroyed by an occasional **illegal** value, then the EQUAL function should select the illegal value.

SELECT ONLY SPECIFIC BITS OF CELL TO BE WATCHED

/WAT[CH] AN[D] value

The directive above selects an optional mask which permits the system to be stopped (or the shadow held) if only a few bits or fields of the watched cell are affected by the failure. The mask value is **ANDED** with the current value of the watched cell whenever the comparison between the EQUAL (or NOT EQUAL) value is made. If hexadecimal notation is used for the mask value, the bits must be 0 where information is to be removed from the value before comparison.

SELECT WATCHER HOLD AT CRITICAL VALUE

/WAT[CH] X

The directive above causes the shadow to be stopped, and a message generated by the Exceptional Condition (X) task on the system operator's terminal, whenever (if) the watched cell reaches the **critical** state. At this stage, the contents of the histogram can be TYPED or DISPLAYED.

SELECT SYSTEM HALT AT CRITICAL VALUE

/WAT[CH] HA[LT]

The directive above causes the shadow to HALT the computer whenever (if) the watched cell reaches the **critical** state. The histogram stack can be examined manually. If the critical value is repaired manually, the system can be resumed. The HALT is used instead of X whenever the failure being watched would lead to the ultimate downfall of the system. This analysis can be made at the earliest hint of a failure.

COMBINATIONS OF THE DIRECTIVE

The various functions of the SHADOW'S WATCH function can be specified on one directive call line and are performed in the order they are specified.

EXAMPLES

```
/WATCH #200/25 EQUAL #FFFF X ON
```

This directive causes the shadow to watch decimal word 25 in actual page #200 placed in the HOLD state and an exception message will be typed to indicate that the histogram stack is frozen and ready to be examined. The watch function is also enabled whenever (if) the shadow is ON.

```
/WAT 0/#20 NOT #8000 AND #E000 HALT ON
```

This directive causes the shadow to watch word #20 in actual page 0 until the upper-most three bits (0, 1, 2) of this word are not equal to the bits '100. At that time, HALT the computer. The watch function is also enabled whenever (if) the SHADOW is ON.

```
//WATCH #FEDO EQUAL #F700 X
```

This directive causes the shadow to watch virtual address #FEDO in MAP 0 until it becomes #F700. Stop the shadow as soon as this critical value is obtained, but do not stop the system.

```
/B/WATCH 0 EQ #41 AND #00FF
```

This directive causes the shadow to watch virtual address 0 in the operand space of task B until the right-most byte becomes #41 (ASCII "A"). The left-most byte is not involved in the watch.

WEOF, BKF, BKR, AVR, AVF

Position Device Assigned To My Logical File On Physical Record Or File Mark Boundaries

The WEOF, BKF, BKR, AVR and AVF Directives define boundaries or position devices according to existing defined boundaries of physical records.

SYNTAX

```
[/tname]/WEO[F]      logfilename [num]
[/tname]/BKF[ILE]
[/tname]/BKR[ECORD]
[/tname]/AVR[ECORD]
[/tname]/AVF[ILE]
```

logfilename	(REQUIRED) Parameter 1 must be the logical file name of the attentive task or a global logical file name.
[num]	(OPTIONAL) Parameter 2 is the number of specified operations to perform, where 1 is assumed by default.

EXAMPLES

```
//WEOF CO
```

Write file mark on operator's terminal.

```
/B/WEOF LO
```

Write file mark on list output file of task B.

Reveal Who Is On Multi-User System

The WHO Directive displays system User IDs, port numbers and the overlay they are running for all terminals having a nonzero User ID. This directive uses the PORTINFO REX Service to access the User ID information, which is maintained by the MAGIC product.

SYNTAX

```
                          1   2       n
[/tname]/WHO        [port port ... port]
```

[port] (OPTIONAL) Parameters 1 and 2 through n display users. Default = All ports are checked for activity.

EXAMPLE

```
/WHO
   3          JACK        SED
   4          JOHN        TOC
   5          BILL        LIB
  10          KIM         SED
  11          JANE        M4E

/WHO 3
   3          JACK        SED
```

WIDTH

Set The Page Width Of A Printing Device

The WIDTH Directive permits the operator to set or vary the page width of any non-spooled print device that is not a MAXNET device. If the directive is followed by no parameters the page width (in words) of each print device is listed.

Although the **page width** of printer symbiont devices cannot be changed with this directive, their **page width** values can be printed. The characters "SYM" appear at the end of the print line to indicate a printer symbiont device.

SYNTAX

[/tname]/WID[TH] [[devicename,[number]]

[devicename] (OPTIONAL) Parameter 1 is the name of the device (printer). The name cannot exceed three characters and must exist in the System Device List.

[number] (OPTIONAL) Parameter 2 is the page width in words. Values specified cannot exceed 67. If this parameter is omitted, the page width (in words) for the devicename specified in Parameter 1 is printed.

EXAMPLES

/WID TY

This form of the directive requests a report of the page width for the TY print device. A sample report follows.

TY #4A

What Is The Holdup With This Task

The WTH Directive displays the state of the attentive task on the CO file. It examines the primary (TCBXST) and secondary (TCBOST) status words and generates messages accordingly. WTH also generates information regarding the task name, I/O that could be offline or stalled, the last loaded overlay if a batch task, and the current PR location.

SYNTAX

[/tname]/WTH

The processed task states along with their corresponding messages are as follows:

I/O Hold:
TASK task name
AWAITING I/O
I/O: logical file name = device name

OC Hold:
TASK task name
OPERATOR HOLD

EXECUTING:
TASK task name
PR = #xxxx [MAP ZERO]

QUEUED:
TASK task name
INACTIVE
SUSPENDED
PR = #xxxx [MAP ZERO]

NOT FOUND:
TASK NOT FOUND

MEMORY HOLD:
TASK task name
AWAITING MEMORY ALLOCATION

SUSPENDED:
TASK task name
SUSPENDED
PR = #xxxx [MAP ZERO]

ROLLED:
TASK task name
ROLLED OUT
PR = #xxxx [MAP ZERO]

NOTES: If the CKN bit is set in TCBXST then the CAN'T KILL NOW message is displayed along with the other status.

If the task is a batch type task then the last loaded overlay message is displayed as follows:
LAST LOADED OVERLAY overlay name

If the task is a batch type task then the following message is displayed:

```
                $JOB    $EOJ
    BETWEEN     $EOJ    $JOB
```

The current state of I/O requests is displayed as:

I/O: logical file name = device name [OFFLINE]

I/O: logical file name = FILE MGR TRANSPORT tna
[OFF LINE]

STALLED DEVICE device name

EXAMPLES

```
XOC/WTH
 TASK OC
 PR = #AFB3 MAP ZERO
 LAST LOADED WTH

XBAT016/WTH
 TASK BAT016
 AWAITING I/O
 I/O: CI = A30
 BETWEEN $JOB $EOJ
 LAST LOADED NEWJOB

XWTH
 TASK BAT001
 INACTIVE
 SUSPENDED
 PR = #783A MAP ZERO
 LAST LOADED GETID

XBAT000/WTH
 TASK NOT FOUND
```

CHAPTER 4
WRITING CUSTOM OC DIRECTIVES

The MAX IV Operating System Operator Communication (OC) Directives provide the system operator with a means of communicating with the system. The operator can use OC Directives to retrieve information from the system; to give information to the system; and to manipulate the system's data structures. The user can add OC Directives to a system by following a few basic guidelines.

4.1 GUIDELINES

No OC Directive module can exceed two pages of object code (512 words). If additional code is needed, the primary module must call a secondary overlay module whose maximum size is also two pages. No limit exists for the maximum number of secondary modules.

The OC Task contains a number of routines for obtaining system information and for outputting information. The user is advised to use these to reduce the size of an OC Directive module.

The OC Task passes some information in registers to the primary module of an OC Directive. The user is free to reuse these registers as long as the information is no longer needed. It is advisable to save this information if secondary modules are to be called.

OC Directives reside in MAP 0 during execution so accessing system information can be done without need for map switching.

The OC Task provides three logical files for OC Directive use. The OC (Operator-to-Computer) file is used to read operator commands. Information is written back to the operator on one of two files. The CO (Computer-to-Operator) file is generally assigned to a terminal device. For hard-copy output the DO (Diagnostic Output) file is used. If the display command format is used (/DIS xxx), output goes to the DO file. If the type command format is used (/TYP xxx), output goes to the CO file.

OC Directives can reside as an overlay on the OC Task's Root Load Module file (SM), as an overlay on the user OC load module file (USM) or as a part of the MAX IV nucleus in MAP 0. The same source code is used for both the MAP 0 resident and the nonresident OC Directive. How the object is handled and how the SYSGEN is done determines whether an OC Directive is resident or nonresident.

The user OC load module file USM is a file provided for the addition of custom OC commands USM is searched for the OC command by the OC task prior to searching SM. Therefore, a custom OC Directive can replace a stan ard OC Directive without deleting the standard directive from the SM file.

4.2 NONRESIDENT OC DIRECTIVE

The most common way for an OC Directive to exist in the system is on the USM file. The last two pages of MAP 0 (#FE and #FF) are reserved for use by nonresident OC Directives. When referenced, each nonresident OC Directive or one of its secondary modules is loaded as an overlay into these two pages. The nonresident OC Directive consumes no additional MAP 0 space.

The object of a nonresident OC Directive is placed on the USM file by the MAX IV Task/Overlay Cataloger (TOC). A module must be cataloged as a PRIVILEGED, RELOCATABLE OVERLAY. A bias must not be specified.

4.3 RESIDENT OC DIRECTIVE

An OC Directive can be made a resident part of the MAX IV nucleus by SYSGEN. The object is placed on the AL4 library using MAX IV Library Update (LIB). Resident OC object modules should be placed in alphabetical order immediately following object module OC.COM.

Include in your SYSGEN source a ROCDIR or a ROCPAC instruction for each directive name. Adherence to naming conventions and the use of the OCLOAD routine are mandatory for resident OC Directives. Refer to sections of this chapter titled OC NAMING CONVENTIONS and OC ROUTINES for more information.

A MAP 0 data structure is created as a directory of resident OC Directives (ROC). It is a singly-linked list pointed to by UCBROC. One entry is built into it for each resident OC Directive. The OCLOAD routine searches this table to determine whether or not a module is resident.

Additional MAP 0 space is consumed for each resident module. The total amount of MAP 0 consumed equals the sum of the exact size of each module plus the size of the resident OC Table.

Resident OC Directives must be reentrant. All flags and buffers must be initialized during each execution of the module.

4.4 OC TABLE

Within the OC Task is a table containing addresses of routines which can be used by OC Directives to perform common functions. It also contains UFTs for the OC and CO files. Additionally, the File Assignment Table (FAT) addresses for the OC and CO files, the attentive task name, the print file name, and the OC buffer are kept there.

OC routines can be accessed through this table by setting Register 2 to the address of the OC Table (OC$TBL) and doing a branch and link through table (BLT instruction) to the routine. Refer to the section of this chapter titled OC ROUTINES for more information.

EXAMPLE:

```
LDM,R2  UCBOCT
BLT,GETTCB
```

Typically, Register 2 need not be loaded since it comes to the primary OC module already set up by the OC Task. Refer to the section of this chapter titled OC REGISTER CONVENTIONS for more information.

OC and CO file UFTs can be accessed by global addresses OC$OCF and OC$COF respectively. Individual words of the UFT can be accessed by the usual UFT offsets (UFTSTA, et cetera). Each UFT is ten words long. I/O is done in standard ASCII using the OC buffer (OC$BUF) with a maximum byte count of eighty characters.

The attentive task name can be accessed two ways. Global addresses exist for both halves of the task name. These are OC$OCE and OC$OC2. Offsets from the address of the OC Table are also defined. These are OC$TBL (offset ATTNAM) and OC$TBL (offset ATTNAX).

Offsets from OC$TBL are also defined for the addresses of the OC file and CO file FATs, and the OC print file name. These are respectively OCFILE, COFILE, and OCFIL.

The OC task contains an eighty character buffer that is used for the input of commands and the output of some messages. It can be accessed by its global address OC$BUF.

4.5 OC ROUTINES

The following routines exist in the OC Task. They can be used by OC Directives by doing a BLT to them where Register 2 is set to OC$TBL.

4.5.1 GET THE TCB ADDRESS OF THE ATTENTIVE TASK

BLT,GETTCB

Returns

R1	Address of the TCB of the Attentive Task
R2-R15	Unchanged

If the task is not in the CPU queue, "TASK NOT FOUND" prints on the file specified in OCFIL.

4.5.2 RETURN AND PRINT VERIFYING BACKSLASH

BLT,RETVER

A "\" is printed on the CO file.

4.5.3 RETURN BUT DO NOT PRINT VERIFYING BACKSLASH

BLT,RETNOV

Normalizes terminal I/O (refer to BLT,NORMIZ). Register 1 is set to either the current TCB address or the MAXNET pointer. If only one read option is set (task option U1 set), return and hold the OC Task (refer to BLT,RETDIE). If MAXNET is in the system and remote batch processing is specified, then return and hold the OC Task; otherwise, get the next OC command.

4.5.4 RETURN AND PRINT AN ERROR UP ARROW

BLT,RETERR

An "^" is printed on the CO file.

4.5.5 NORMALIZE TERMINAL I/O

BLT,NORMIZ

Returns

R1	Current TCB Address
R2	OC file UFT Address
R8	Changed
R9	Changed

Gives up exclusive use of the CO and OC files. If OC was initiated from a terminal device, then it sets writes have priority over reads. Turns off emergency queuing.

4.5.6 PRINT BUFFER WITH UPSPACE

BLT,PRIBUP

The message contained in OC$BUF is printed with an upspace to the file named in OC$TBL and OCFIL. This file name will be the CAN-code value of either CO or DO. Message length is maximum of eighty characters. Terminates message with a 0.

4.5.7 PRINT BUFFER USING CARRIAGE CONTROL IN BUFFER

BLT,PRIBUF

The message contained in OC$BUF is printed to the file named in OC$TBL and OCFIL. The carriage control is provided by the user in the beginning of the buffer. The message length is a maximum of eighty characters. Terminates the message with a 0.

4.5.8 PRINT VERIFYING BACKSLASH BUT DO NOT RETURN

BLT,PRIVER

A "\" is printed on the CO file. Control returns to the OC Directive.

4.5.9 PRINT AN ERROR MESSAGE FROM E$M

```
LDI,R1          Class
LDI,R3          Condition
BLT,PRIERR
```

Calls E$M using OCLOAD to print the specified error message. Refer to a section of this chapter titled OC ERROR MESSAGES for more information.

4.5.10 PRINT A MESSAGE

```
LDI,R15          Buffer
BLT,PRIMSG
```

Prints a message from the specified buffer address to the file named in OC$TBL and OCFIL. Message must be terminated with a 0. Maximum message length is eighty characters.

4.5.11 PRINT A MESSAGE TO A SPECIFIED FILE

```
LDI,R14          Logical Filename
LDI,R15          Buffer
BLT,PRIFIL
```

Prints a message from the specified buffer address to the logical Filename specified in R14. Message must be terminated with a 0. Maximum message length is eighty characters.

4.5.12 RETURN AND HOLD THE OC TASK

```
BLT,RETDIE
```

Normalizes terminal I/O by calling NORMIZ. Sets OC Hold. Returns without printing a verifying backslash (RETNOV).

4.5.13 LOAD AN OC MODULE

```
LDI,R14      @XXX  OC MODULE NAME
BLT,OCLOAD
```

Returns

R4	Changed
R5	Changed
R9	OC Module Name
R12	Virtual address of overlay if a nonresident OC module
R13	OC's Root Load Module File Name (SM)

Searches the resident OC Table (ROC) for the OC module name. If found, it branches to that module. If a nonresident OC module, it loads that module as an overlay from SM. If unable to load the module it prints an error message and returns to the OC Task via RETERR. If it was unable to find the module, it prints "XXX INVALID DIRECTIVE" using PRIMSG. If it was unable to load the module from disc, it prints "XXX LOAD ERROR".

4.6 FINISHING YOUR OC DIRECTIVE

There are six ways to end your OC Directive. Choose the one which most closely fits your needs. Refer to the section of this chapter titled OC ROUTINES for more information.

RETDIE Return and suspend the OC Task.

RETNOV Return to the OC Task to queue another read operation.

RETVER Return as in RETNOV except print a verifying backslash to indicate to a operator that the directive has completed successfully.

RETERR Return as in RETNOV except print an up arrow ("^") to indicate to the operator that the previous directive was erroneous.

OCLOAD Load a secondary module and continue processing with that module.

PRIERR Print an error message from E$M and return as in RETNOV.

4.7 OC REGISTER CONVENTIONS

Upon entry into the primary module of an OC Directive, some registers contain information for the convenience of the OC module. The user is free to modify these registers so long as their values are no longer needed.

R2 Address of the OC Table (OC$TBL).

R6* CAN-code value of the first three characters of the attentive task name.

R7* CAN-code value of the second three characters of the attentive task name.

R9 CAN-code value of the three-character OC Directive name.

R10 Address of the OC buffer (OC$BUF).

R11 Byte pointer to the first parameter position in OC$BUF.

*Registers R6 and R7 are loaded from the OC table entries for the attentive task name (ATTNAM, ATTNAX). If // was typed, the attentive task name in the table is not modified unless option Bit U4 is set in which case the X-task name is placed in the table (@X,0).

4.8 OC NAMING CONVENTIONS

An OC Directive must be a unique 1- to 3-character CAN-code name. All secondary modules to an OC Directive must be given a unique 3-character CAN-encodable name which has as its middle character a dollar sign ("$"). This dollar sign is used to prevent a secondary module from being executed as a primary module.

An entry point name for an OC Directive must be OC$xxx where xxx is the name of the directive. An entry point must be defined for each OC Directive contained in the module. Secondary modules must also have entry points. This standard is required if the module could be memory resident. In addition, for the module to be resident an INTERNAL name must be defined for each OC$xxx.

All nonresident OC Directives must be cataloged with TOC onto SM or USM using a 1- to 3-character name. All secondary modules must be cataloged with TOC as their 3-character names. TOC DUPLICATE names must also be 1- to 3-character CAN-code names.

4.9 OC ERROR MESSAGES

A number of error messages exist in a common error message secondary overlay called E$M. By supplying appropriate parameters OC Directives can use E$M as an error exit to print an error message and return to the OC Task.

The calling sequence is

```
LDI,R1      CLASS
LDI,R3      CONDITION
BLT,PRIERR
```

where

CLASS and CONDITION are values specified as in the table below.

NOTE: Systems with resident OC Directives may desire to make E$M resident. OC Directive modules ABO, ACT, and REW use PRIERR for their error exits.

CLASS	CONDITION (NZOC)	MESSAGE
0	0000	TASK NOT FOUND
	0001	TASK INCOMPATIBLE
	0010	PRI < LIMIT PRI
	0011	TIM OR INT UNAVAIL
	0100	ILLEGAL PARAM
	0101	REQ. TCB TOO LARGE
	0110	REQ. TSK IS AN OV
	0111	NO ROOM FOR TCB
1	0000	TASK NOT FOUND
	0001	TASK NOT ACTIVE
	0010	NO VAR EXT AREA
	0011	NO ROOM IN VAR EXT
	0100	XUSE TKN BY OTHR TSK
	0101	XUSE NOT ALLOWED
	0110	
	0111	
2	0000	TSK NF OR NOT EST
	0001	TASKS INCOMPATIBLE

4.10 EXAMPLE: DEFINE AN OC DIRECTIVE

Define an OC Directive ABC with duplicate names AB and C and with a secondary module A$C. Define the OC Directive so that it can be either resident or nonresident. SYSGEN it as resident.

The following three OC Directives will produce the same output:

```
/ABC
/AB
/C
```

Define the source:

```
            PGM         ABC                 PROGRAM NAME
            INT         OC$ABC              INTERNAL NAMES
            INT         OC$AB
            INT         OC$C
            .
            :
OC$ABC      EQU         $                   ENTRY POINT NAMES
OC$AB       EQU         $
OC$C        EQU         $
            .
            :
            LDI,R14     @A$C
            BLT,OCLOAD                      LOAD THE SECONDARY MODULE
            END
```

Define the secondary module:

```
            PGM         A$C                 PROGRAM NAME
            INT         OC$A$C              INTERNAL NAME
            .
            :
OC$A$C      EQU         $
            .
            :
            END
```

Assemble ABC and A$C:

```
$ASS SI=USL BO=SCA
$POS ABC
$EXE M5A
$WEO BO
$POS A$C
$EXE M5A
$WEO BO
```

Insert in AL4 Library:

```
$ASS SI=SCA BI=AL4 BO=SCD
$EXE LIB
LNA
ADD OC.COM              PLACE ABC AFTER OC.COM
ADD ABC                 PLACE A$C AFTER ABC
COP
ASS BI=SCD BO=AL4
COP
EXI
```

Place on USM:

```
$ASS BI=SCA
$EXE TOC
FIL USM
OVE                     Overlay
PEC REL PRI             relocatable, privileged
CAT ABC                 /ABC
DUP ABC AB              /AB
DUP ABC C               /C
AVR BI
CAT A$C                 Secondary module
EXI
```

SYSGEN statements to make ABC resident:

```
ROCDIR    ABC
ROCDIR    AB
ROCDIR    C
ROCDIR    A$C
```

To define a resident OC package, add the following macro to IVSYS:

```
OCPABC    MAC
          ROCDIR    ABC
          ROCDIR    AB
          ROCDIR    C
          ROCDIR    A$C
          EMP
```

Now SYSGEN ABC as a resident package:

```
ROCPAC    ABC
```

4.11 EXAMPLE: ISX - INPUT STATUS DIRECTIVE

The following is a listing of the source and catalog of one of the standard OC Directives (the input status or ISX Directive).

```
        TTL             INPUT STATUS FROM DEVICE(S) OC DIRECTIVE 'ISX'
        PGM             ISX
        SPC             3
*****************************************************************
*       MODULE HISTORY:
*       PRODUCT:  MAX IV OPERATING SYSTEM
*       CATALOG NUMBER:  610304-899
*       PART:  OC DIRECTIVES
*       MODULE:  ISX
*       EXTERNAL DISPOSITION:  OVERLAY ON SM FILE
*       INTERNAL DISPOSITION:  NONRESIDENT OC DIRECTIVE
*       INITIAL ENTRY:
*                       REVISION: G
*       LAST RELEASED:
*                       REVISION: G
*                       REASON:  INITIAL ENTRY
*       LAST UPDATE:
*                       REVISION: G
*                       REASON:  ADD DOCUMENTATION COMMENTS
*****************************************************************
        SPC             3
        INS*            MC,IVEQUATES    DEFINE REX CALL SYMBOLICS
        INS*            MC,IVSEQU       DEFINE SYSTEM DATA STRUCTURES
        SPC             3
*       INTERNAL DEFINITION
        INT             OC$ISX
        SPC             3
*       NO EXTERNAL REFERENCES
        SPC             3
*****************************************************************
*       MODULE DESCRIPTION:
*       THIS OC DIRECTIVE PERFORMS AN INPUT STATUS INSTRUCTION FOR
*       ONE OR ALL USER SELECTED DEVICE ADDRESSES AND THEN OUTPUTS
*       THE DEVICE ADDRESS AND STATUS TO THE APPROPIATE PRINT FILE
*       PROVIDING THE DEVICE STATUS WAS NON-ZERO
*
*       DIRECTIVE FORMATS:
*
*       /ISX N          INPUT STATUS FROM DEVICE ADDRESS 'N'
*       /ISX TNA        INPUT STATUS FROM DEVICE ADDRESS ASSOCIATED
*                       WITH TRANSPORT NAMED 'TNA'
*       /ISX            REPORT NON-ZERO STATUS FROM ALL DEVICE
*                       ADDRESSES
*****************************************************************
        SPC             3
```

```
*****************************************************************
*       EXECUTION ENVIRONMENT:
*       REGISTER CONTENTS ESTABLISHED BY O$C OC SETUP OVERLAY
*       REGISTERS REFERENCED:
*       2               OC TASK BLT TABLE ADDRESS
*       10              DIRECTIVE BUFFER BASE ADDRESS
*       11              DIRECTIVE BUFFER BYTE DISPLACEMENT
*****************************************************************
        SPC
*       OC DIRECTIVE ENTRYPOINT
OC$ISX  EQU             $               OC DIRECTIVE ENTRYPOINT
        LDI,8           COLLECT         MAX IV REX CALL NUMBER
        REX,MAXIV                       GET FIRST CALLING ARGUMENT
        HNS,NUMARG                      XFER IF ARG IS NUMERIC
        HCS,SIMARG                      XFER IF NON-NUMERIC ARG
        SPC
*       NO ARGUMENT SUPPLIED SO SCAN ALL DEVICE ADDRESSES
        ZRR,9                           SET DEVICE ADDRESS TO ZERO
LOOPDA  EQU             $               SCAN ALL DA'S LOOP
        BLM,5           SCANDA          PULL AND PRINT CONTROLLER STATUS
        ABR,9,15                        INCREMENT DEVICE ADDRESS
        TBR,9,9                         HAS RANGE 0-#3F BEEN TESTED ?
        HCR,LOOPDA                      XFER IF NOT TO ITERATE
        BLT,RETVER                      RETURN TO OC WITH VERIFY
********
*       CONVERT NUMERIC DEVICE ADDRESS TO INTERNAL REPRESENTATION
NUMARG  EQU             $               ARGUMENT WAS NUMERIC DEVICE ADDR
        TBRB,12,0       ARGERR          XFER IF ARG IS NEGATIVE
        TBR,15,8                        TEST OTHER ARG STATES
        HNS,ARGERR                      XFER IF ARG IS RELATIVE
        HCS,ARGERR                      XFER IF ARG IS TOO LONG
        LDI,8           ATN             MAX IV REX CALL NUMBER
        REX,MAXIV                       CONVERT ASCII ARG TO BINARY NMBR
        HNR,ARGERR                      XFER IF ARG NOT CONVERTABLE
        TBR,14,1                        T ST ARG CONV RESULT STATES
        HNS,ARGERR                      XFER IF > 16 BITS LONG
        HCS,ARGERR                      XFER IF FRACTIONAL
        TBRB,13,0        RGERR          XFER IF ARG NEGATIVE
        CRI,13          #3F             DEV ADDR IN RANGE 0-#3F ?
        HGT,ARGERR                      XFER IF NOT
        SPC
*       PULL CONTROLLER STATUS AND RETURN TO OC TASK WITH VERIFY
PLPTDS  EQU             $               SETUP AND CALL PULL STAT AN PRNT
        TRR,9,13                        DEVICE ADDRESS TO TEST
        BLM,5           SCANDA          PULL STATUS AND PRINT
        BLT,RETVER                      RETURN TO OC WITH VERIFY
********
        SPC
*       CONVERT TCT NAME TO INTERNAL REPRESENTATION
SIMARG  EQU             $               ARGUMENT IS TRANSPORT NAME
        LDI,8           ATC             MAX IV REX CALL NUMBER
        REX,MAXIV                       CONVERT ASCII TO CAN-CODE
        HNR,ARGERR                      XFER IF NOT CAN ENCODABLE
        SPC
```

```
        FIND USER REQUESTED TCT IN SYSTEM CONFIGURATION
        LDI,1       UCBTCT-TCTLNK  ADDRESS OF ADDRESS OF FIRST TCT

FINTCT  EQU         $              FIND SELECTED TCT ADDRESS
        LDM,1,1     TCTLNK         ADDRESS OF NEXT TCT ?
        HZS,ARGERR                 XFER IF NO MORE TCT'S
        SPC
*       TEST TCT NAME WITH ONE REQUESTED BY DIRECTIVE CALL ARGUMENT
        CRS,13,TCTNAM              IS THIS THE SELECTED TRANSPORT ?
        HZR,FINTCT                 XFER IF NOT TO KEEP LOOKING
        LDS,1,TCTPDT               GET PDT ADDRESS FROM TCT
        LDS,12,PDTGUN              GET GROUP/UNIT FROM PDT
        RLD,12,4                   ALIGN UNIT IN REG 13
        RLS,12,4                   ALIGN GROUP IN REG 12
        RLD,12,12                  DEVICE ADDR IN REG 13 BITS 8-15
        MLR,13,13                  ZERO BITS 0-7 IN REG 13
        HOP,PLPTDS                 PULL & PRINT STATUS & RETURN OC
        SPC
*       SYNTACTICALLY OR SEMANTICALLY INCORRECT ARGUMENT
ARGERR  EQU         $              ARGUMENT SYNTAX/SEMANTIC ERROR
        BLT,RETERR                 RETURN TO OC IN ERROR
********
        SPC         3
*****************************************************************************
*       FETCH HARDWARE CONTROLLER STATUS AND IF NON-ZERO PRINT THE
*       DEVICE ADDRESS AND STATUS ON THE APPROPIATE FILE.
*       DEVICE ADDRESS IS IN REGISTER NINE
*       LINKAGE IS ON REGISTER FIVE
*       DESTROYS REGISTERS: 4, 6, 7, 8, 12, 13, 14, & 15
*****************************************************************************
SCANDA  EQU         $              PULL AND PRINT DEVICE STATUS
        TRR,6,9                    XFER DA FOR SPLITTING INTO G/U
        RLD,6,4                    ALIGN G/U ALONG WORD BOUNDARY
        RLS,7,4                    SEPARATE GROUP/UNIT BY 4 BITS
        RLD,6,8                    RIGHT JUST GROUP/UNIT IN REG 7
        LDI,4       ;              PUT INPUT STATUS INSTR IN REG 4
        ISA,13,$$                  BASIC INPUT STATUS INSTRUCTION
        EXR,4,7                    SAMPLE CONTROLLER STATUS
        BXZS,5                     RETURN IF NO CONTROLLER POWER
        LDI,8       HEX            MAX IV REX CALL NUMBER
        REX,MAXIV                  CONVERT STATUS TO HEX ASCII
        STMD,12     CNTRST         SAVE STATUS IN PRINT BUFFER
        TRR,13,9                   DEVICE ADDRESS IN BINARY
        REX,MAXIV                  CONVERT DA TO HEX ASCII
        STM, 3      CNTRDA         SAVE DA IN PRINT BUFFER
        LDM,14,2    OCFIL          OC FILE LFN AS PER TYP/DIS
        LDI,15      DASTMG         DA/STATUS MESSAGE ADDRESS
        BLT,PRIFIL                 PRINT MSG ON APPROPRIATE FILE
        BRX,5                      RETURN TO INVOKER
********
        SPC         3
*       OPERANDS
        SPC         3
*       DEVICE ADDRESS AND DEVICE STATUS MESSAGE
```

```
DASTMG  DFC             "  DA=#"
CNTRDA  DFC             "++"                DEVICE ADDRESS IN HEX ASCII
        DFC             "  STATUS=#"
CNTRST  DFC             "::::",#2000        CONTROLLER STATUS HEX ASCII
        SPC             3
        END             OC$ISX
```

PROCEDURE TO CATALOG AN OC DIRECTIVE

To catalog an OC Directive, enter the following Job Control Directives.

```
$JOB  CATALOG AN OC DIRECTIVE
$ASS BI SCA  (THIS ASSUMES THE ASSEMBLER OBJECT OUTPUT IS ON SCA)
$EXE TOC
FILE SM
OVERLAY
PEC REL PRI
CATALOG
EXIT
$EOJ
```

APPENDIX A
OPERATOR DIRECTIVES IN ALPHABETIC ORDER

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